

Military Strategy and Operational Art

AIR POWER IN THE INDIAN OCEAN AND THE WESTERN PACIFIC

UNDERSTANDING REGIONAL SECURITY DYNAMICS

Edited by
Howard M. Hensel



Air Power in the Indian Ocean and the Western Pacific

This book examines the security dynamics of the Indian Ocean and the Western Pacific, concentrating upon an analysis and evaluation of the air power capabilities of the various powers active in the two regions.

The volume is designed to help improve understanding of the heritage and contemporary challenges confronting the global community in the Indian Ocean and the Western Pacific, as well as to illuminate the policies of the various powers involved in the affairs of these regions, and the military capabilities that are available in support of those policies. The 16 individual chapters examine both the traditional and the non-traditional threats that confront the various Indian Ocean and Western Pacific powers, and assess the roles played by land-based and naval, fixed-wing and rotary-wing, manned and unmanned aircraft, as well as by offensively and defensively capable ballistic and cruise missiles in addressing these challenges. In doing so, the various chapters analyze and evaluate the air power doctrine, capabilities, deployment patterns, and missions of the respective states. In addition, they assess the future issues, challenges, and responses involving air power as it, acting in concert with other military instruments, seeks to contribute to securing and promoting the interests of the state.

This book will be of much interest to students of air power, strategic studies, Asian and Middle Eastern politics, and International Relations.

Howard M. Hensel is Professor of Strategy at the Air War College, USA. His previously published books include *Maritime Security in the Indian Ocean and the Western Pacific* (2018) and *Naval Powers in the Indian Ocean and the Western Pacific* (2018).

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Edited by Professor Howard M. Hensel

Air War College, USA

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First published 2020
by Routledge
2 Park Square, Milton Park, Abingdon, Oxon OX14 4RN

and by Routledge
52 Vanderbilt Avenue, New York, NY 10017

Routledge is an imprint of the Taylor & Francis Group, an informa business

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British Library Cataloguing-in-Publication Data

A catalogue record for this book is available from the British Library

Library of Congress Cataloging-in-Publication Data

A catalog record has been requested for this book

ISBN: 978-0-367-49693-7 (hbk)

ISBN: 978-1-003-04699-8 (ebk)

Typeset in Times New Roman
by Wearset Ltd, Boldon, Tyne and Wear

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Introduction¹

Howard M. Hensel

I

The vast expanses of the Indian Ocean and the Western Pacific are bordered by three continents, Africa, Asia, and Australia, with their waters extending southward toward a fourth continent, Antarctica. The western limits of the Indian Ocean basin reach southward from Suez, the Red Sea, and the Bab al-Mandeb, along the coast of east Africa, to the Cape of Good Hope. Moving northeastward from the shores of east Africa, following the ocean's northern shoreline, the Indian Ocean region includes the Gulfs of Aden and Oman, and into the Persian Gulf and the Arabian Sea. Moving around the Indian subcontinent, which occupies the centerpiece along the basin's northern shore, the Indian Ocean region crosses the Bay of Bengal, before extending southeastward along the southwestern limits of the Indonesian Archipelago and the northwestern and western shores of the Australian continent. Bordering the eastern limits of the Indian Ocean is the Western Pacific. It extends northward from Australia and New Zealand, through the Solomon and Gilbert Islands, through the Indonesian Archipelago, to the Philippines, the Philippine Sea, and the South China Sea. It then continues northward through the East China Sea and the Yellow Sea. It also includes the waters west of Japan and the Kurile Islands – the Sea of Japan and the Okhotsk Sea – before extending eastward to include the Caroline, Marshall, Mariana, and the Aleutian Islands, with Wake and Midway Islands pointing even farther eastward across the enormous expanse of the central Pacific toward the Hawaiian Islands and Pacific's eastern shore.

The peoples living in the countries along the shoreline of the Indian Ocean and Western Pacific reflect tremendous cultural, religious, and linguistic diversity, as well as a wide range of political and economic systems. While there are many factors that serve to divide these various societies, they have also long been socially and economically intertwined, not only with each other, but also with the broader global community. As observed in the first of this volume's earlier companion works, *Maritime Security in the Indian Ocean and the Western Pacific*, however, in contemporary times, the “trans-oceanic avenues traversing the Indian Ocean, linked, in turn, to the waters of the Western Pacific have assumed much greater geo-strategic significance, since they have become vitally central to the economic survival and prosperity of the global community.”²

Indeed, with respect to the world's energy resources alone, over 30 percent of the oil transported by sea passes through the Strait of Hormuz and over 25 percent of the oil shipped by sea passes through the Strait of Malacca.³

This volume represents a continuation of a multi-volume effort published by Routledge, designed to help scholars and policy makers to better understand the heritage and contemporary challenges confronting the global community in the Indian Ocean and the Western Pacific, as well as to illuminate the policies of many of the powers involved in the affairs of these regions, as well as the military capabilities that are available in support of those policies. The first volume in the Indian Ocean and Western Pacific series of companion works, entitled *Maritime Security in the Indian Ocean and the Western Pacific*, analyzed and assessed the maritime heritage and contemporary, traditional maritime challenges confronting the global community in the Indian Ocean and the Western Pacific.⁴ The second volume, *Naval Powers in the Indian Ocean and the Western Pacific*, examined the ways in which the individual powers active in the Indian Ocean and the Western Pacific perceive both the traditional and non-traditional challenges inherent within these regions, as well as analyzed and evaluated their respective interests, objectives, and policies in the Indian Ocean and the Western Pacific. This second volume in the series, however, focused primarily upon an analysis and assessment of the naval capabilities, deployment patterns, and maritime strategies of the various naval powers active in the Indo-Pacific.⁵

This, the third of these companion volumes, entitled *Air Power in the Indian Ocean and the Western Pacific*, represents a continuation of our efforts to understand the dynamics of these two economically and strategically interconnected regions by concentrating upon an analysis and evaluation of the air power capabilities of many of the powers that are active in the Indian Ocean basin and the Western Pacific region. The 16 chapters in this volume examine both the traditional and non-traditional threats that confront these powers and assesses the roles played by their land-based and naval, fixed wing and rotary wing, manned and unmanned aircraft, as well as the offensively and defensively capable ballistic and cruise missiles as they attempt to address these challenges.

In doing so, the various chapters focus on a series of topical themes that are interwoven throughout the book. These topical themes seek to illuminate various aspects of contemporary air power by analyzing and evaluating air power doctrine, capabilities, deployment patterns, and missions, within the context of the joint interrelationship between the air component and the other components of the military/naval establishments of the respective states. In addition, the various chapters will assess future issues, challenges, and responses involving air power as it, acting in concert with other military instruments, seeks to contribute to securing and promoting the interests of the state.

II

The littoral countries of the Indian Ocean and the Western Pacific and, more broadly, the entire global community are confronted with a large and diverse

variety of very significant and sometimes urgent challenges. Some of these challenges are “non-traditional.” They include: humanitarian disasters, such as destruction and/or injury caused by severe storms, flooding, earthquakes, tsunamis, volcanic eruptions, drought, and famine; environmental air and water pollution; and challenges associated with climate change, including rising sea levels, excessive temperatures and humidity levels, etc. The outbreak and the spread of contagious diseases domestically and across international borders can, unfortunately, expand into regional and global pandemics. In addition, “non-traditional challenges” also include piracy, illicit fishing, and smuggling, especially weapons smuggling, human trafficking, and narco-trafficking. Unfortunately, there are many situations in which there are egregious violations of human rights, sometimes with individual states passively allowing these violations to occur, or worse, in other cases, with governmental authorities actually facilitating and even participating in these violations. Finally, there are many reasons for the migration of peoples, but refugee problems are all too common throughout the Indian Ocean and Western Pacific regions.

Many states in the Indian Ocean basin and the Western Pacific are confronted with internal political instability caused by various ethnic or tribal insurgents, and/or domestic terrorists. Indeed, many of these states have, in the recent past, experienced or are currently experiencing major rebellions, civil wars, separatist movements, or movements seeking greater local or regional autonomy. Moreover, transnational, violent, extremist politically, ideologically, or religiously motivated groups, such as al-Qaeda, the ISIS, and al-Shabab, etc., represent a very serious and often immediate challenge.

There are also a number examples of long unresolved conflicts in the Indian Ocean basin and the Western Pacific, such as on the Korean Peninsula and concerning Taiwan. In addition, there are a number of territorial disputes and border conflicts, such as regarding: the status of Jammu and Kashmir; areas along the Indian-Chinese border; claims to natural and artificial islands in the South China Sea and the East China Sea; tensions between Japan and Russia concerning disputed islands; and the claims of indigenous peoples against Great Britain with respect to the British Indian Ocean Territory. Air and maritime violations of national sovereignty also represent a serious and immediate threat to many states in the Indian Ocean basin and the Western Pacific.

The proliferation of weapons of mass destruction and missile technologies, cyber threats, as well as security threats jeopardizing the extraction and overland/maritime transport of valuable raw materials and energy resources represents an especially grave challenge to the global community. Lastly, geostrategic competition and rivalry among regional and global powers can often create sub-regional and, more broadly regional and trans-regional instability.

Many of these challenges are unique to particular sub-regions within the much larger Indian Ocean or Western Pacific regions. Other challenges, however, transcend sub-regions, while still others are common to the whole of the Indian Ocean basin or the entirety of the Western Pacific region. Challenges

such as these have been, and should continue to be approached within the appropriately defined sub-regional or regional geographical context.

Many other traditional and non-traditional challenges, however, are common to the whole of the Indian Ocean and Western Pacific regions. Indeed, the dependence of members of the international community on raw materials and energy resources emanating from the littoral countries of the Indian Ocean basin and Western Pacific alone makes it imperative to ensure the security of maritime transit through the international waters of the Indian Ocean and the Western Pacific, as well as, more broadly, to ensure the security and stability of the Western Pacific and the Indian Ocean basin.

Air power is an especially flexible instrument of policy that is capable of performing a wide variety of operational functions in response to these various traditional and non-traditional challenges. These include: airlift; humanitarian assistance; disaster relief; search and rescue operations; counter-terrorism; interdiction of illicit human, weapons, and drug traffic; combatting piracy and other criminal activities; and counter-insurgency operations, etc. In addition, air power is especially useful in conducting intelligence, surveillance, and reconnaissance operations. It contributes to deterrence and, if required, can: enable a “show of force”; engage in aerial denial operations (no-fly zones); and assist in facilitating economic sanctions via quarantine. In addition, if necessary, after seizing local or general air superiority, air power can conduct raids against specific targets; facilitate forced entry; and coerce adversaries. Finally during periods of general armed hostilities, especially following the establishment of air superiority and, optimally, air supremacy, air power can, alone or in combination with other elements of military power, perform such operational functions as: theater and point air defense, strategic bombing operations in order to degrade/destroy the adversary’s critical infrastructure, war making resources, and logistical capabilities; disrupt the adversary’s ability to concentrate and deploy military and naval forces; conduct deep interdiction operations; provide close air support for friendly forces as they engage and, optimally, destroy the enemy’s field forces; and help to sustain friendly forces in theater.

III

Many of the littoral and non-littoral powers of the Indo-Pacific have identified China as a major threat to stability and the rules-based international order in the Indian Ocean and the Western Pacific. Within the Western Pacific region, much of the attention concerning China’s increasingly assertive policy focuses on Chinese activities in the South China Sea and the East China Sea. Indeed, basing its claims upon historical records, Beijing asserts that the islands in the South China Sea and in the East China Sea, such as the Paracel, Spratly, and Diaoyu/Senkaku Islands, are central to China’s national interests. In addition to oil and gas reserves located in the South China Sea, control over these islands is valuable in that the shipping lanes that traverse these waters are strategically important to China and the international community. Moreover, the islands

provide a natural barrier protecting China's shores, as well as strengthening the People's Republic of China's position vis-à-vis Taiwan. Finally, from Beijing's perspective, control over these islands is a way to counter the U.S. presence in the waters of the Western Pacific.⁶

As Richard Bitzinger observes, in addition to its “‘creeping assertiveness’” policy in the South China Sea, Beijing has also become increasingly active in the Indian Ocean region as it seeks to protect and advance its interests west of Malacca. These interests include the protection of its maritime lines of communication, thereby ensuring the security of the maritime transit of energy resources from the Persian Gulf to China, as well as the security of its commercial trade ties with Europe, eastern Africa, and South Asia. In addition, Beijing also hopes that by establishing a permanent presence in the Indian Ocean it will help to legitimize its role as a global power, as well as counterbalance the Western powers, especially the U.S., in the basin. Finally, China's naval presence in the Indian Ocean also serves to counterbalance India's “‘Look/Act East’” policies in the region and into the Western Pacific. Indeed, such Chinese initiatives as the Belt and Road Initiative, the Maritime Silk Road, and the Asian Infrastructure Investment Bank, all suggest a Chinese intention to establish a permanent presence in the basin. In addition to infrastructure projects, the Chinese have established a “‘logistical support facility’” in Djibouti, as well as constructed deep-water port facilities at Colombo and Hambantota in Sri Lanka; at Karachi and Gwadar in Pakistan; at Sittwe in Myanmar; and at Port Victoria in the Seychelles. In addition, China also has access to a number of commercial ports throughout the basin. These facilities provide Beijing with the ability to support Chinese naval operations in the Indian Ocean, and well as to facilitate Chinese commercial activities, extending from the Red Sea and the Horn of Africa to the Strait of Malacca.

As Xiaoming Zhang discusses, consistent with its increasingly assertive policies within the South China Sea, the East China Sea, and in the Indian Ocean basin, for the past two decades the Chinese leadership has embarked upon a military reform effort designed to promote an intensifying emphasis on joint operations within the Chinese military establishment. Specifically with respect to the Chinese Air Force, Zhang states,

This advancement includes a shift in the PLAAF's operational focus from a territorial defense force to one that is capable of both defensive and offensive operations (*kongfang jianbei*) with integrated “air-space” (*kongtian yiti*) capabilities and the acquisition of advanced air superiority fighters, airborne and space-based C2 and ISR and platforms, long-range anti-aircraft and anti-missile systems, refueling aircraft, and heavy lift capabilities.⁷

Thus, notwithstanding technological constraints, as well as organizational impediments, Zhang maintains that the Chinese Air Force has made great strides in modernizing its aerospace capabilities and expanding its roles so as to enable

it to conduct both defensive and offensive operations in support of its national interests and policy objectives.

Alexey Muraviev and Alexandr Burilkov maintain that Russia and China have both “emerged as alternative centers of global geopolitical, geo-economic (China) and military (Russia)” power, challenging the rules-based international order and counterbalancing the Western powers in the twenty-first century global, great power balance.⁸ Indeed, Muraviev and Burilkov agree with Rebecca Grant that the developing partnership between Beijing and Moscow may serve to reconfigure the balance of power in Asia and the Western Pacific. Russia is characterized as a dissatisfied state that seeks to revise the existing balance of power. The NATO alliance is seen by Moscow as its main threat, although transnational terrorism by violent extremist organizations is also seen by Moscow as a threat to Russian security. In addition, Moscow recognizes that there are growing risks associated with instability and power rivalries within various sub-regions, such as on the Korean Peninsula, in the South and East China Seas, and with respect to Taiwan. In this context, the Russians have expressed concern that local confrontations in these sub-regions could escalate into major hostilities involving the great powers. Russian air power, in conjunction with its naval power, reinforced by a comprehensive layered air defense network (AD), is seen as pivotal to strategic deterrence, as well as to tactical and theater-level defensive and offensive operations. For example, the missions of the Russian Air Force in the Far East include: “air superiority; delivering effective air to ground support, including against maritime targets; strategic strike (LAR); multi-echeloned AD of key strategic assets, main population, and industrial centers; long-range patrol, surveillance, and strike capability; theater to theater and out of area transport operations; reconnaissance and electronic counter-measures; search and rescue; and environmental monitoring.”⁹

For the past 75 years, the United States has been and continues to be the most powerful actor in the Indo-Pacific. As Rebecca Grant points out, the U.S. and its partners in the Indian Ocean basin and the Pacific are committed to maintaining a rules-based international order in which the entire global community can freely engage in commercial relations in an environment characterized by free and secure maritime and air communications, as well as secure access to space and to the free flow of information through open cyber networks. In short, the United States and its partners are committed to maintaining an “Indo-Pacific commons.” She agrees with Alexey Muraviev and Alexandr Burilkov, however, that the policies of both China and Russia pose a fundamental challenge to this concept of an Indo-Pacific commons. Indeed, she cites the 2017 *National Defense Strategy*, which observes that “‘China and Russia want to shape a world antithetical to U.S. values and interests.’” Moreover, like Muraviev and Burilkov, she emphasizes that “the problem isn’t just Russia or China,” it is both “Russia and China combined.” Consequently, “facing their combined forces in a dispute stand out as the top planning scenario for the 2020s and beyond.”¹⁰ Indo-Pacific security rests upon deterring Beijing and Moscow from taking actions that profoundly challenge the U.S.’s aforementioned interests. It is, in turn,

central to the U.S. policy of deterrence for Washington to clearly demonstrate to both adversaries, as well as to its regional partners, that it is willing and able to provide effective leadership in confronting any power or coalition of powers that would actively threaten those interests. In addition to resolve, a successful deterrence policy rests upon a clearly visible military capability that can, should it become necessary, successfully confront and prevail against aggressive actions by hostile powers. Air power is central to that military capability. The challenges of applying air power in the vastness of the Pacific and Indian Oceans are, however, quite formidable. As Grant observes, "U.S. airpower will have to deliver a flexible range of options for everything from watching the Strait of Malacca to seizing local air superiority in disputed waters, to turning back China's mounting power projection forays, even abetted by Russia."¹¹ It is in this context that she analyzes and assesses five problems confronting the contemporary application of U.S. air power potentially against China and Russia in the Pacific and the Indian Oceans. First, she cites the threat presented by the Chinese ballistic and cruise missiles directed against the U.S.'s forward bases and deployed naval, air, and ground forces. Second, she notes that control of the electromagnetic spectrum, which is critical for communications and "domain awareness," represents a serious challenge for the U.S. military in the Indo-Pacific. The third challenge is associated with ensuring America's ability to project air power and, related, the fourth challenge focuses on the U.S.'s ability to decisively concentrate air power so as to secure air superiority in critical localities and, thereby, deprive the adversary of its ability to threaten allies, seize territory, and/or effectively challenge assembled U.S. and coalition naval, air, and ground forces. Fifth, the Chinese and Russian ability to project air and naval power across the vast expanse of the Pacific represents another very serious threat to the United States, beyond the aforementioned four challenges that are localized in the Western Pacific and in East Asia. In light of these challenges, Grant maintains that a "credible deterrence will depend on extra efforts to keep modernization of aircraft, weapons, sensors and command and control on track,"¹² especially the accelerated acquisition of a fifth-generation fighter force, advanced long-range reconnaissance capabilities, expanded B-2 and B-21 bomber capabilities, a modernized air refueling tanker force, as well as theater and point defenses designed to actively counter enemy air and missile attacks. Finally, Rebecca Grant stresses the importance of jointness in planning and conducting military operations within the vast expanses of the Indian Ocean and the Pacific.

Although several European powers also have interests in the Indian Ocean basin and Western Pacific region and, furthermore, many have contributed to NATO, European Union, and/or other coalition military operations in these regions, only two European powers – Great Britain and France – maintain a permanent presence in the basin and the Pacific and have the capability to credibly and effectively project a significant amount of military force into these two regions. As discussed by Douglas Peifer, London and Paris seek to uphold and further strengthen the international legal order, with special reference to maintaining a

“rules-based” commercial and international maritime system. In addition, both powers seek to protect their citizens, defend their holdings and other strategic interests throughout the Indian Ocean and the Pacific, as well as promote trade and investment throughout these regions, especially British and French aerospace and other defense-oriented exports. Highlighting the threats posed by transnational violent, extremist groups, instability caused by rivalries and assertiveness by various powers in sub-regions of the basin and the Western Pacific, a general erosion of the rules-based international order, and a variety of non-traditional challenges, the British and the French governments intend to rely upon a full, multi-dimensional spectrum of policy instruments, including, but not limited to air, naval, and military power, as they seek to defend their interests in the basin and the Western Pacific region. Hence, both the British and the French maintain basing facilities and continue to deploy both naval and air forces throughout the two regions. London and Paris recognize, however, that their capacity to project military power east of Suez is limited and, consequently, both Britain and France have established and maintain bilateral and multilateral security partnerships with various regional states, as well as look to the United States to complement and supplement their capabilities.

IV

In addition to the Chinese and Russian challenges to stability and the rules-based international order, a variety of other traditional and non-traditional challenges confront the various powers of the Western Pacific. In Northeast Asia, the Democratic People’s Republic of Korea (North Korea) continues to pose a serious threat to its neighbors in the region. In his analysis of the challenge presented by North Korea, as well as his assessment to North Korea’s military capabilities, Daniel Pinkston points out that, notwithstanding North Korea’s disadvantages in terms of population size, its level of economic development, and its limited incorporation of advanced technologies, the North Korean leaders have attempted to offset these disadvantages by relying upon “nuclear weapons, chemical weapons, ballistic missiles, cruise missiles, cyber, electronic warfare, special operations forces, and extensive underground facilities,” in addition to relying upon their formidable ground force capabilities.¹³ In conjunction with his analysis and assessment of the North Korean political system, Pinkston points out that North Korea’s ruling Korean Workers Party, and especially its current leadership, dominated by Kim Jong-un, places great emphasis on “strong ethnic nationalism.” In this context, notwithstanding North Korea’s failed effort during the Korean War to unify the peninsula by military force, the North Korean leadership remains committed to the goal of unifying the peninsula under communist rule. While the contemporary North Korean leaders have shown a willingness to use limited force, provided that there is a low risk of escalation, the North Korean leadership is rational and wishes to survive. Pinkston goes on to note that the doctrine of the Korean armed forces rests upon “‘four military lines’: ... train the army as a cadre army; modernize the army; arm all of the

people; and fortify the country on the basis of equipping the army and the people politically and ideologically,” enhanced by a resolute “fighting spirit.”¹⁴ He further observes that North Korea’s “offensive military strategy is based upon three main concepts”: surprise, speed, and the operational, joint integration of forces. As a result, the North Koreans anticipate capitalizing on the element of surprise to deny the Americans and the South Koreans the ability to launch air operations, as well as to neutralize the latter’s air defense forces and degrade their command, control and communications assets, their logistical support capabilities, and their mobilization and troops concentration centers. Simultaneously, the North Koreans plan to use conventional mechanized, armor, and light infantry forces, reinforced by close air support, to quickly and decisively interdict the adversary’s lines of communication and facilitate the North Korean Army’s rapid advance deep into South Korean territory. Finally, the North Koreans also emphasize joint force integration by relying upon asymmetric warfare, including cyber, electronic, UAV, and special operations capabilities, all designed to “create confusion” among the adversaries through a multitude of attacks directed against a diverse array of assets, at any location, and at any time.¹⁵

With a population of almost 52 million people, the Republic of Korea (South Korea) has the world’s eleventh largest economy. As Kevin Madden points out, however, notwithstanding South Korea’s enviable economic position, the South Koreans confront a number of extremely serious and sometimes immediate challenges. While the primary threat continues to emanate from North Korea, Seoul also views China, Japan, and Russia as potential threats to South Korean security. In addition, as a major ally of the United States, South Korea continues, as it has in the past, to contribute to security in the Western Pacific region and beyond. The South Korean Air Force, operating within the context of the South Korean joint defense structure, performs a two-fold mission; it serves as a central part of South Korea’s deterrent posture, while, simultaneously, remaining prepared to “act as the ‘essential force ensuring victory’ during wartime.” Madden states that the South Korean Air Force “sees as essential tasks the surveillance of enemy indications as part of the national indications and warning apparatus and maintenance of ‘the utmost combat readiness posture’ in order to respond to provocations and transition to or prosecute war.”¹⁶ Close, combined cooperation with U.S. military forces, especially the U.S. Air Force, is critical in facilitating these missions. For example, according to Madden, in the event of major hostilities with North Korea, the South Korean Air Force, acting in close concert with U.S. air power, will seek to “degrade” North Korea’s “offensive air capability” by means of air defenses and air-to-air fighter sorties. Following the establishment of South Korean and U.S. air superiority, the two air forces will cooperatively transition to close air support designed to degrade the North Korean army’s capabilities, combined with efforts to degrade and destroy North Korea’s capacity to generate sustainable combat power from follow-on forces and reserves. Finally, the combined air forces will also play an important role in supporting South Korean and U.S. counter-offensive ground operations.¹⁷ While Madden states that South Korea’s high quality, sizable air force is currently well

prepared to fulfill its assigned roles in the defense of South Korean security, the Republic of Korea's future capacity to sustain its air power capabilities is challenged by the dramatically increasing costs of technologically sophisticated hardware, especially when juxtaposed against fiscal constraints and competing, expensive social programs. Moreover, South Korea's declining birth-rate, the declining popularity of military service, abbreviated conscription terms, and accompanying shorter training periods in which to gain familiarity and experience with technologically complex weapons systems, all suggest serious future challenges as Seoul attempts to maintain the high standards of South Korean air power.

Bret Perry and John Bradford analyze Japan's security concerns and the role played by the Japanese Air Self-Defense Force in addressing these concerns. As seen from Tokyo's perspective, the strategic challenges in the Northeast Asian sub-region emanate from North Korea, China, and, to a lesser extent, Russia. Notwithstanding the passage of time, Japanese relations with both the Koreas, as well as China, continue to be influenced by memories of Japanese imperialism during the first half of the twentieth century. In contemporary times, the Koreas, China, and Russia all have territorial claims that clash with Japanese claims. Beyond their respective claims to disputed territory, China and North Korea both pose an immediate, very serious security threat to Japan. Both states possess weapons of mass destruction, as well as the associated delivery capabilities to threaten Japanese cities. In addition, the Chinese are capable of militarily enforcing their territorial claims by using force to seize disputed islands. Japanese authorities have responded to these challenges by relying upon air power to deter and, if necessary, defend Japanese airspace against acts of aggression that would threaten Japanese security, sovereignty, and territorial integrity, as well as upon Japanese naval and air forces to ensure the security of Japan's vital sea lines of communications. Hence, the Japanese Air Self-Defense Force maintains a very large fighter capability, backed, in turn, by a robust intelligence, surveillance, and reconnaissance (ISR) capability, as well as air mobility capabilities, designed, in turn, to support the repositioning of forces to defend and, if necessary, retake territory. Finally, the 1960 Japanese-American Treaty of Mutual Cooperation and Security, backed by the American military presence in Japan, serves to further ensure Japan's security, as well as the security of the Northeast Asian sub-region.

Looking southward, the states of the Southeast Asian sub-region of the Western Pacific are confronted with both traditional and non-traditional challenges. Sub-regional security is increasingly challenged by the conflicting claims of China, Taiwan, Vietnam, the Philippines, Malaysia, and Brunei to disputed islands and overlapping exclusive economic zones in the South China Sea. In particular, as discussed by Maria Ortuoste and Zenel Garcia, notwithstanding their extensive trade links with China, Beijing's forward policy, emphasizing the militarization of both artificial and natural islands in the South China Sea, is seen as an especially serious threat to several of the Southeast Asian states, as well as to U.S. interests and those of many other members of the global community. Moreover, Ortuoste and Garcia point out that several of the Southeast

Asian states have had or are currently experiencing varying levels of domestic instability caused by insurgencies, communal and separatist groups, and transnational terrorists. In addition, they note that, while the threat to maritime shipping through the Strait of Malacca has somewhat reduced in recent years, maritime pirates continue to pose a security challenge, especially in Indonesian and Philippine waters. Illicit fishing and smuggling activities constitute another major threat to the Southeast Asian sub-region. Natural disasters, exacerbated by climate change, such as typhoons, tsunamis, and rising sea levels, present another type of challenge to the Southeast Asia countries. While some powers, such as Singapore, possess a powerful air force, other Southeast Asian states lack the resources to develop and sustain large and robust air power capabilities. Moreover, given the scope of the traditional and non-traditional challenges confronted by these states, they are required to be able to respond to a very large range of possible security scenarios. Hence, in addition to air defense capabilities, many Southeast Asian states have emphasized command, communications, and control, as well as ISR capabilities. For many of the Southeast Asian states, however, the priority has been on acquiring and maintaining assets useful for humanitarian responses to natural and man-made disasters, especially airlift capabilities. Finally, responding to this wide spectrum of challenges, the Southeast Asian powers emphasize the need for cooperation among the various air, maritime, and land-based services.

As Carol Abraham points out, New Zealand has interests in the Southeast Asian sub-region, as well as eastward into the South Pacific and southward to Antarctica. For New Zealanders, the “four pillars of security and prosperity” are “‘supporting a rules-based international system; participating in international and regional bodies; leveraging a network of strong bilateral relationships; and building a diverse portfolio of export markets.’”¹⁸ Indeed, reflecting New Zealand’s regional role, not only does New Zealand maintain an alliance with Australia, it also maintains partnerships with Great Britain, Singapore, and Malaysia through the Five Power Defense Arrangement, as well as with other sub-regional powers through ASEAN. Moreover, New Zealand also maintains close relationships with the United States and Canada. Economically, New Zealand has extensive trade relations, foremost with China, but also with a number of other regional and global partners. New Zealand’s national security policy is conditioned by the absence of direct threats to its sovereignty and territorial integrity, as well as the vast geographic expanse encompassing its areas of interest. Hence, adopting a whole of government approach, the focus of New Zealand’s defense posture rests upon maintaining the security of its maritime borders and its electronic, sea, and air lines of communication, responding to natural and man-made disasters, humanitarian relief, protecting of the environment, combatting transnational criminal activities, joining with other powers in the global community to maintain a rules-based global order, responding to various destabilizing security challenges, and, if necessary, participating in international, combat-oriented, coalition operations. As such, in recent years, New Zealand’s air power regeneration emphasis is focused on ISR, air mobility, and naval air combat capabilities.

V

Moving westward into the Indian Ocean basin, building upon his aforementioned assessment of Chinese activities in the Indian Ocean, Richard Bitzinger examines the roles played by the United States and India in the Indian Ocean region, with special reference to the region's eastern portion. In doing so, he complements the material presented by Douglas Peifer in which Peifer analyzes and evaluates the role of the British and the French in the Indian Ocean basin. With respect to the U.S. military presence in the Indian Ocean, Bitzinger stresses the vital importance of the U.S. base at Diego Garcia. He observes that "Diego Garcia is one of two critical U.S. Air Force (USAF) bomber bases in the Asia Pacific region, along with Anderson Air Base, located in Guam," thereby making it "possible for the United States to project military power northwest toward the Persian Gulf, Middle East, and South Asia, west into Africa, and eastward into Asia." As a result, he asserts that Diego Garcia is "critical" in counterbalancing the growing Chinese presence in the basin.¹⁹ With respect to India, Bitzinger points out that, notwithstanding the fact that "the Indian military still has considerable problems with projecting power even into the nearby seas, ... like China, India has great power ambitions." Indeed, the Indian military has expanded its activities in both the western and eastern Indian Ocean. For example, in addition to enhancing both the quality and quantity of ships assigned to India's Eastern Naval Command, it has "established a joint command in the Andaman Islands, in order to provide improved surveillance and intelligence-gathering in the eastern Indian Ocean."²⁰ Moreover, India also recently concluded an agreement with Myanmar under the terms of which India would be permitted to operate Myanmar's port at Sittwe, thus challenging China's influence in Myanmar. In addition, India has also expanded its military and economic links with Singapore, Malaysia, Indonesia, and Vietnam, as exemplified by India's multi-lateral cooperation with the Southeast Asian states in conducting escort patrols in the Strait of Malacca.

Continuing westward to the Indian sub-continent, Harish Masand analyzes India's geo-strategic security challenges and critically evaluates the roles and capabilities of the Indian Air Force and the Indian Navy in addressing these challenges. He points out that India's security is threatened by "the full spectrum of conflict from nuclear to sub-conventional" and geographically by "the possibility to a two to three front war."²¹ These challenges emanate from China and Pakistan. In addition to concern about China's forward pressure in the South China Sea, New Delhi is especially concerned about Chinese occupation of portions of territory in the Ladakh and Aksai Chin areas, Beijing's claims to Arunachal Pradesh, as well as Chinese violations along the line of control, including the confrontation between the Chinese and the Indians in Doklam in 2017. Moreover, Indian authorities are concerned about the growing Chinese maritime presence in the Indian Ocean, which suggests the potential of a simultaneous Sino-Indian military confrontation both in the north, as well as in the waters of the Indian Ocean to the south. These challenges are compounded when one takes into

account Chinese support for Pakistan, thereby raising the possibility of an additional front in the northwest. Indeed, Pakistan remains a low level, but significant, perpetual threat to Indian security as a result of Pakistan's alleged support for terrorist attacks in Jammu and Kashmir, as well as elsewhere in India. In short, as seen from New Delhi's perspective, Chinese support for Pakistan, combined with Chinese claims and aggressive actions along the Sino-Indian border, as well as its growing maritime presence in the Indian Ocean, all suggest a concerted policy by Beijing to strategically encircle India. In his critical assessment of the role of Indian air power in addressing these challenges, while Masand notes areas of both doctrinal progress and the acquisition of a variety of "force multipliers" by Indian Air Force, overall, he suggests that there are very significant deficiencies in the IAF's ability to deter China and even Pakistan. Indeed, he concludes that current budgetary constraints continue to negatively impact the modernization of equipment and negate the technological advantages that Indian air power has traditionally maintained over its adversaries. Thus, he predicts that, if budgetary trends continue into the future,

despite the doctrinal emphasis on power projection in the region by both the Air Force and Navy, looking at the relative overall strength of air forces in the region, the rapid modernization of Chinese air power assets and even the Pakistan Air Force with Chinese help, it is considered unlikely that Indian air power would be able to effectively meet the challenges or even deter its likely adversaries from any misadventure in the Indo-Pacific in the long-term on its own.²²

Viewing the India-Pakistani balance of power from the Pakistani perspective, Kaiser Tufail also cites border tensions as a major source of contention between the two powers. In addition, he also cites the threats posed to Pakistani security by violent, extremist, non-state terrorist groups. Indeed, he stresses that "fighting a perennial insurgency, while maintaining a credible deterrent posture against its eastern neighbor, remains the biggest challenge" for Pakistan and its air force.²³ Although he predicts that the likelihood of a major war between India and Pakistan involving conventional operations in which the belligerents attempt to seize strategic locations within each other's homeland is remote, he does suggest that armed conflict on a more limited scale is possible. Hence, he stresses the need for the Pakistani Air Force to maintain a robust ISR capability, as well as the capability to secure local air superiority, so as to enable it to effectively provide battlefield air support for ground operations. He notes that, should a prospective military conflict extend beyond a short war scenario, depending upon the direction of ground operations, deep air interdiction could yield important advantages. He further observes that conventional strategic bombing designed to target the adversary's war-making resources would be advantageous only in a prolonged conflict. He warns, however, that a prolonged conflict between India and Pakistan could risk escalation across the nuclear threshold. Indeed, he adds that the Pakistani Air Force "has a key role in the country's full-spectrum

nuclear deterrence, and maintains an air-launched strategic strike capability as part of a comprehensive nuclear triad.”²⁴ Finally, he speaks of the role played by Pakistan’s Air Force in counter-insurgency operations. Overall, Tufail concludes that, notwithstanding periodic supply interruptions, combined with budgetary shortfalls, Pakistan maintains a “fully operational” and “combat hardened air force.”

VI

Continuing into the Western Indian Ocean and the Persian Gulf sub-region, David Palkki, Steven Watts, and William Tatum analyze Iran’s perceptions of its role in the Middle East, Tehran’s assessment of the challenges that it confronts, and the roles played by the various elements of its armed forces in responding to those challenges. The authors note that, since the establishment of the Islamic Republic, the Iranian leadership has sought to: perpetuate the revolutionary gains made domestically within Iran; defend Iran’s sovereignty and territorial integrity; prevent any future “humiliation” of Iran by the great powers; “reclaim” Iranian hegemony in the Gulf sub-region; and undermine the existing regional order; while, simultaneously, spreading the Iranian-led Islamic revolution throughout the Middle East. As Tehran pursues these goals, the Iranian leadership believes that it is internationally isolated and surrounded by hostile forces that threaten the existence of the Islamic Republic. Foremost among these hostile forces are the conservative Arab monarchies of the Gulf, backed, in turn, by the United States and its international partners. Hence, the Iranians rely upon the military to help safeguard the security of the Islamic Republic as it pursues its sub-regional and regional objectives. While the doctrinal role of air power is to defend Iranian territory and, simultaneously, be capable of launching long-range strikes against an adversary, Iran’s existing conventional military forces may prove to be inadequate to deter aggression by adversarial powers. In order to help compensate for this inadequacy, Iran has tended to emphasize air defense to deter potential adversaries and, if deterrence fails, defend Iranian territory, while, at the same time, also emphasizing unconventional, asymmetric warfare in areas adjacent to and extending beyond Iran. Moreover, the authors maintain that Iran has also hoped to deter conventional attacks by pursuing a policy of “nuclear hedging,” defined as “‘a national strategy of maintaining or at least appearing to maintain, a viable option for the relatively rapid acquisition of nuclear weapons, based on an indigenous capacity to produce them in a relatively short time frame ranging from several weeks to a few years.’”²⁵ Looking to the future, if Iran were to actually acquire nuclear weapons, supported by a reliable delivery capability, Tehran would then be able to deter conventional attacks by credibly threatening to escalate across the nuclear threshold and launch nuclear first-strikes against the adversary. Conversely, even in scenarios in which the adversary was the first to escalate to nuclear strikes, assuming that Iran’s nuclear assets were survivable, Iran would possess the capability to visit retaliatory damage against assets that the adversary values.

Turning to the Arab side of the Gulf, Joseph Kéchichian analyzes the security challenges confronting the six Arab monarchies of the Gulf sub-region that compose the Gulf Cooperation Council and evaluates the air power assets that are available to these states in addressing these challenges. Kéchichian states that Iran represents “the single most critical ideological threat” to the Arab monarchies of the Gulf sub-region. The leaders of revolutionary Iran are said to seek the elimination of the monarchies and “to literally occupy Islam’s holiest cities.”²⁶ In addition to this total political objective, Iran is also seen as supporting various extremist elements throughout the Middle East. Finally, Kéchichian notes the challenge posed by the Iranian backed Houthis in Yemen. While maintaining that the GCC states hope to avoid war with Iran, Kéchichian stresses that the Arab monarchies must remain vigilant and prepared for a range of eventualities. In this context, the GCC states rely heavily upon air power to monitor potential enemy capabilities and deployment patterns, deter potential enemies from violating their sovereignty and their vast territorial integrity and, if necessary, defend against enemies by remaining capable of destroying the enemy’s forces, while also striking the assets of adversaries located deeply within enemy territory. Notwithstanding their extensive investments in air power capabilities, however, the GCC states confront a series of political and military problems. Centrifugal political forces and tensions between the members of the GCC, as illustrated by the recent confrontation between Qatar and other members of the GCC, have tended to weaken the alliance. Indeed, the GCC states have tended to avoid multilateral arrangements and, instead, entered into bilateral partnerships with the United States, Great Britain, and France. Similarly, cooperation and coordination among the GCC militaries, as well as shortages of trained personnel and issues involving the incorporation of advanced military technologies remain problem areas for the GCC states. Moreover, equipment maintenance and logistical considerations also remain challenges, as are shortages in ISR, UAV, and air refueling capabilities.

In addition to the Strait of Malacca and the Strait of Hormuz, the Bab al Mandeb constitutes the third, critical maritime chokepoint in the Indo-Pacific. Unfortunately, however, the Red Sea–Horn of Africa–Gulf of Aden sub-region is characterized by ongoing conflicts, directly or indirectly involving regional and great powers, as well as a number of extremist non-state actors. As discussed by Asher Orkaby, the civil war in Yemen has not only been a major source of instability in the strategically significant Red Sea–Horn of Africa–Gulf of Aden sub-region, the displacement caused by the war has created an especially egregious humanitarian crisis. Orkaby provides a detailed analysis and assessment of the origins and conduct of the war in Yemen, highlighting Saudi Arabia’s military role in the conflict. In addition, Orkaby also analyzes and evaluates the sources of instability in Somalia, noting that

even as the multinational African Union Mission in Somalia has cooperated with Somali troops to expel the al-Shabab armed insurgency from the main populations centers in the country, the group has evolved its military tactics

and broadened its target area to undermine Somali and neighboring state authority through brazen and deadly terrorist attacks.²⁷

Finally, Orkaby highlights the U.S. military presence in Djibouti which serves “as the primary base of operations for the U.S. Africa Command and as the coordinator of counterterrorist multi-force operations in East Africa.” Indeed, he asserts that Camp Lemonnier in Djibouti has “served as the aerial drone base, coordinating strikes in Somalia, Yemen, and terrorist training camps in the vicinity of the Red Sea and East Africa and earning the title of the ‘busiest Predator drone base outside of Afghan war zone’.”²⁸

Finally, Theo Neethling analyzes and critically evaluates the role played by air power within the broader context of the South African Defense Force, in addressing the challenges confronting contemporary South Africa. Citing the 1998 *Defense Review*, Neethling maintains that “peace and stability in South Africa could only be achieved in a context of regional stability and development.”²⁹ Therefore, he cites a number of defense analysts who have stressed that the South African National Defense Force, including its air component, should be prepared to actively participate with other African powers in conducting non-traditional missions, especially peacekeeping operations, on the African continent. Unfortunately, however, due to chronic underfunding, the South African military, including the South African Air Force, has experienced a gradual deterioration in its capabilities. Among the shortfalls cited are inadequacies in airlift capabilities, shortages of rotary wing transports, and the failure to replace light and medium fixed wing transport. Moreover, Neethling sees little reason for hope that the deterioration of South Africa’s military capabilities will soon be reversed. Indeed, he predicts that continued degradation of the South African military, including the South African Air Force, will inevitably have a negative impact on South Africa’s ability to successfully respond to the challenges that it confronts during the coming years.

VII

As suggested in many of the chapters in this volume, in addition to the very significant and, in some cases, immediate challenges to sub-regional, regional, and trans-regional stability in the Western Pacific and the Indian Ocean basin posed by China, Russia, North Korea, and Iran, there are also a variety of other significant traditional and non-traditional challenges that are ubiquitous throughout the entire Indo-Pacific.

Consequently, in addition to dealing with various sub-regional and regional challenges, each with its own unique characteristics, statesmen, military planners, leaders of global commerce, and scholars have increasingly come to recognize that, in many respects, the Indian Ocean basin and the Western Pacific region constitute an integrated strategic and economic whole that is, in turn, vital for the economic and military security of the entire global community. Hence, in addition to the many sub-regional and regional challenges to stability, the more

broadly defined challenges encompassing the entire Indo-Pacific, such as fundamental challenges to the rules-based order in these two strategically and economically interconnected regions, must be addressed in an integrated, holistic manner.

Diplomatic instruments, synergistically applied in conjunction with other instruments of policy, can help to effectively respond to, or at least manage these various traditional and non-traditional challenges. Military power, generally, and air power, specifically, are important components in this synergistic blend of mutually reinforcing policy instruments.³⁰

The contributors to this volume hope that it, along with its two previous, companion volumes, will help foreign policy and national security policy makers, and members of the commercial and academic communities, as well as others, to better understand the scope and nature of the various traditional and non-traditional challenges confronting the global community within the Indian Ocean basin and the Western Pacific region and the role that air power plays, in concert with other military and non-military policy instruments, in addressing these challenges.

Notes

- 1 The opinions, conclusions, and/or recommendations expressed or implied within this introduction are solely those of the author and should not be interpreted as representing the views of the Air War College, the Air University, the U.S. Air Force, the U.S. Department of Defense, or any other U.S. government agency.
- 2 H. M. Hensel 2018a, p. 261.
- 3 N. Hensel, 2018, p. 140.
- 4 Hensel and Gupta, 2018a.
- 5 Hensel and Gupta, 2018b.
- 6 Zhang, 2018; Li, 2018.
- 7 Chapter 2, p. 45.
- 8 Chapter 1, p. 22.
- 9 Chapter 1, pp. 28–29.
- 10 Chapter 3, pp. 65–66.
- 11 Chapter 3, p. 70.
- 12 Chapter 3, p. 77.
- 13 Chapter 5, p. 103.
- 14 Chapter 5, p. 106.
- 15 Chapter 5, pp. 107–108.
- 16 Chapter 6, p. 128.
- 17 Chapter 6, p. 137.
- 18 Chapter 9, p. 197.
- 19 Chapter 10, pp. 221–222.
- 20 Chapter 10, p. 218.
- 21 Chapter 11, p. 229.
- 22 Chapter 11, p. 241.
- 23 Chapter 12, p. 259.
- 24 Chapter 12, p. 247.
- 25 Chapter 13, p. 273.
- 26 Chapter 14, p. 285.
- 27 Chapter 15, p. 322.

28 Chapter 15, p. 320.

29 Chapter 16, p. 328.

30 H. M. Hensel, 2018b, pp. 247–253.

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Part I

The global powers



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1 Russia

Alexey Muraviev and Alexandr Burilkov

Traditionally, air power has played a very important role in the security and defense of the Russian Far East. Since the mid-1930s, the Soviet Union has made systematic efforts in building up its tactical and strategic offensive and defensive air power capability. Combat and support aircraft played key roles in Soviet operations against imperialist Japan during a short border conflict near the lake Khasan in 1938; during an army level campaign in outer Mongolia in mid-1939; and during the Soviet strategic offensive in Manchuria in August–September 1945. Elements of the air force and naval aviation were pivotal in Soviet multidomain systematic deterrent operational activities throughout the Cold War. Units of the Long Range Aviation (LRA) based east of the Ural Mountains took part in aerial strategic deterrent operations.

In the twenty-first century, the Western Pacific faces a new wave of geopolitical and geostrategic competition caused by both accelerating rivalry between the world's leading major military powers, the United States (US), Russia, and the People's Republic of China (PRC), and regional powers, which are in the process of upgrading their already formidable military capabilities, also in support of their claims to play greater roles in regional and global affairs. Like in the past, the contest for air power dominance and denial of air supremacy to your geopolitical rivals forms one of the core factors of force modernization programs.

The chapter is structured as follows. It begins with an introduction to the origins and drivers of Russian air strategy since 2000, especially as relations soured with the established Western powers after 2014. The chapter then goes on to catalog the direct application of Russian airpower in the Indo-Pacific through an examination of the organizational structure, order of battle, ongoing modernization, and operational activities of the *Voenno Kosmicheskie Sily Rossiiskoi Federatsii* (Russian Federation Air Space Force or RFASF) in the Eastern Military District (MD). The chapter concludes with an examination of the indirect exercise of Russian airpower via the export and provision of air technology, especially advanced air defense (AD) systems that present a substantial deterrent to external intervention.

Russian air power and air power strategy

Russian grand strategy focuses on mitigating external influence in the post-Soviet space, especially that stemming from the existing liberal world order.¹

Russia is a regional and global power that is dissatisfied with the existing status quo in global affairs,² and conducts both foreign and defense policy aimed at mitigating Western influence, from direct military modernization to indirect policies such as arms exports, especially of systems that can credibly be used for conventional deterrence against the North Atlantic Treaty organisation (NATO)-type forces. Strategic documents identify NATO as the primary threat, though other issues, especially terrorism and the integrity of the sparsely populated spaces of the Far East, are a mounting and explicitly stated concern.³ Russian contemporary strategic thinking as well as operational and strategic planning is driven by the deteriorating relationship with the West, especially in the wake of the Ukrainian crisis and the associated annexation of Crimea, sanctions and counter-sanctions, as well as the Russian military campaign in Syria and elsewhere, though this trend is a constant in post-Soviet Russian strategy and has manifested already in instances such as the war in Georgia in August 2008.

Despite seemed preoccupation with security risks and threats to the country's west and southwest Russia keeps a close eye on the geostrategic developments in East Asia. From the military-strategic perspective, the northeastern part of the Western Pacific represents a unique geostrategic configuration. Northeast Asia sees the geographical interaction of three leading military powers and major nuclear powers (Russia, the PRC, and the US by means of its presence in Japan and the Republic of Korea [RoK]), and one minor (undeclared) nuclear power with an aging but still considerable conventional military potential, the Democratic Republic of Korea (DPRK). This established configuration highlights highly complex and often controversial transformations of the regional geostrategic environment post-1991.

In the first half of the twenty-first century the PRC's rapid rise as the economic superpower combined with its growing global ambitions are causing strategic concern in the US, Asia, and Europe. The rapid build-up of its military capability, Beijing's power projection capacity across the Western Pacific and beyond, confrontational behavior in the the South China Sea (SCS), and its aggressive push into the South Pacific are all forcing the international community to formulate a new strategic approach towards Beijing, driven more by an intent to contain and deter China's ambitions than embrace and accept them.

The age of unipolarity, which has effectively replaced the Cold War bipolar strategic system, is gradually giving way to a new global geopolitical configuration. China and Russia (the BIG TWO) have emerged as alternative centers of global geopolitical, geo-economic (China), and military influence (Russia). Both Moscow and Beijing openly contest the international rules-based order, which is the foundation of strategic *modus operandi* of western nations and other like-minded states.

There are growing concerns that the current geopolitical instability and intensifying great power rivalry may trigger a major war involving leading military powers in the Western Pacific, notably the US, the PRC, and Russia. In the case of the latter, an open confrontation with the US-led coalition may engage either the PRC or Russia, or even a sporadic alliance of the BIG TWO, should both

Beijing and Moscow find fighting together compelling from the point of each country's survival as sovereign nations.

There are various scenarios that identify potential causes of a war in the Western Pacific. For example, the Russian General Staff identified a number of escalator points – conflict triggers. Besides the SCS disputes, the Taiwan dilemma, and the crisis in the Korean peninsula noted above, the following points are worth noting:

- Significant military presence and force modernization of the US and its key regional allies (Japan, RoK, Australia) aimed at containing militarily Russia and the PRC;
- High levels of operational and exercise activity within the Asia-Pacific strategic theater, involving strategic assets (carrier battle groups and strategic bomber force); and
- Deployment of anti-ballistic missile (ABM)/ballistic missile defence (BMD) elements.⁴

It is likely that these views are being shared by the People's Liberation Army (PLA) operational and strategic planners, also because of close consultation and coordination between the militaries of the BIG TWO.

Complex evolving geopolitical realities of the Western Pacific reinforced by the strategic fluidity and a strong degree of uncertainty noted earlier, and continuous risks of an open confrontation push regional players to build up their conventional deterrent and power projection capabilities, with air power capability representing a viable option. The strategic value of modern air power is well understood by major regional countries as being both one of the principal determinants of national sovereign capability to respond to any external pressures and an effective power projection option. There is a continuous strategic interest by major regional powers to develop and maintain integrated, expeditionary capable air forces comprising all major elements of modern air power: tactical and long-range air superiority aircraft; tactical and long-range strike capability, including assets responsible for strategic strike, tactical and strategic airlift, and mid-air refueling capabilities; patrol, surveillance, reconnaissance, and targeting capabilities.

Russian strategic and defense thinkers estimate that military conflicts in Northeast Asia are likely to draw on considerable military forces, particularly naval battle groups supported by the massive use of modern air power. For example, Russian defense analysts, whilst modeling a large-scale conflict with the US and its allies in the northwestern Pacific, estimate that the US-led coalition is likely to launch the so-called *vozdushnaya nastupatel'naya operatsiya* (aerial assault operation, AAO) as part of its offensive campaign. The first core objective of a strategic AAO would be to gain and maintain continuous dominance in the aerospace, and by that undermine adversaries' ability to engage in consolidated defensive campaigns. The follow on aim of a strategic AAO would be incapacitating the enemy's fighting, industrial, and mobilization

potential to continue resistance; cripple its will to fight; and support of other multidomain operations until the strategic end (military and political victory) is achieved.

According to their assessments, a potential large-scale conflict between Russia and the US led coalition is likely to have the latter assemble a combined force of some 2,000 to 2,500 various purpose aircraft (including 1,100 to 1,300 combat fixed wing), 1,200 to 1,500 rotary aircraft, some 500 to 600 unmanned aerial vehicles (UAVs), and 1,500 to 2,000 cruise missiles. The strategic AAO could comprise a sequence of smaller scale AAOs depending on the level of the adversary's effective resistance, and could run from two to three weeks to up to two months.⁵

As in the past, the Russian military consider formidable multirole air power and a comprehensive layered AD essential to its peacetime activities, including conventional and strategic deterrent operations. In times of crisis and war both arms are regarded as pivotal for both success of ground and naval operations as well as the country's survival as a sovereign nation. Organizationally, the RFASF comprises the following elements:

- Air force;
- AD and ABM/BMD;
- Space troops;
- Special purpose (electronic countermeasures, communications);
- Logistical support;
- Education and R&D.

These elements are responsible for the following tasks:

Table 1.1 RFASF elements and missions

<i>Element responsible</i>	<i>Tasks/missions</i>
AD and ABM/BMD	Defense of centers of gravity (command and control centers, strategic command, major groupings of forces, key population centers, and major elements of physical infrastructure Intercepting incoming MIRVed ICBMs/SLBMs and cruise missiles
Air force	Attacking enemy targets by conventional and unconventional (nuclear) means Supporting other elements of the Russian armed forces
Space troops	Strategic communications Space monitoring and intercept of space-based threats Space launches, operating and maintaining orbital elements (satellites)

Source: S.N. Borisko, S.A. Goremykin, "Analiz Sostoyaniya Vozdushno-Kosmicheskikh Sil Rossii. Perspektivy Razvitiya," *Voennaya Mysl*, N 1 2019, pp. 25–37.

Having recovered from the hard times of the 1990s, with 3,200 fixed-wing and rotary aircraft supported by the growing fleet of UAVs, the RFASF remains the second largest air force after the United States Air Force (USAF), though it is highly geographically dispersed.⁶ Furthermore, it retains a substantial qualitative edge over its nearest competitors in size, China's People's Liberation Army Air Force/Naval Aviation Force (PLAAF/PLANAF) and the Indian Air Force (IAF). Though the PLAAF has modernized rapidly in recent years as China's influence and ambitions stretch beyond its immediate region and to the global level, it remains dependent of imports and license production of Russian aerospace technology.⁷ Furthermore the PLA has not fought in armed conflict since 1979. As for the IAF, despite substantial air capabilities and the tense flashpoint in Kashmir that provides a modicum of air experience, much of said fleet is outdated, even "vintage" by the standards of India's Ministry of Defense (MoD), while modernization is almost entirely reliant on external partners, including Russia.

Contrary to the air forces of Asia's largest military powers, the RFASF can now be recognized as a battle hardened highly trained force. It has been a central pillar of Russian expeditionary operations in Syria as well as other recent conflict zones, thus accruing substantial combat experience in a variety of high-intensity scenarios,⁸ including complex interservice operations.⁹ During the intensive phase of Russia's aerial campaign in Syria (2015–17), the RFASF carried out some 34,000 combat sorties; 80 percent of all pilots of tactical aviation and 90 percent of all helicopter crews gained combat experience, most performing 100 to 120 combat sorties.¹⁰

Russian military modernization has intensified substantially since 2014, with a host of new land, air, naval, space, and cyber systems being unveiled, mass-produced, and deployed. Over the past decade, the Russian armed forces (RusAF) have significantly intensified their combat training and operational activity. After Sergei Shoigu was appointed Defense Minister in 2012, the level of combat training achieved a noticeable qualitative leap. A practice of snap inspections (*vnezapnye proverki*) of the state of combat readiness of units, army groups, and operational-strategic commands was introduced. An emphasis is on improving the effectiveness of operational flexibility, also through the factor of maneuver, either within a theater of operations, or between different theaters. When the RusAF elements are spread across the country and Russia no longer has the capacity to sustain sufficient army groups along its entire perimeter; the factor of maneuvering forces has become essential to national defense and threat response planning.

Though increases in the military budget slowed down in 2018 and are expected to remain static for some time, this is due to the achieved success of the modernization program, including the all-important task of becoming independent from Ukrainian suppliers, including helicopter engines and some other critical spares. This dependence on Ukraine was the result of the once integrated Soviet arms production network, which was spread across the USSR, being split between the successor republics.¹¹ This qualitative improvement is matched by quantitative improvements on many fronts, as aging equipment is being upgraded or replaced, the proportion of professional personnel expanded, and the

stocks necessary to maintain operational effectiveness in all theaters replenished, including the increasingly important Eastern MD. Between 2012 and early 2020 the RFASF acquired over 1,400 new and modernized fourth generation fixed-wing and rotary aircraft, allowing it to reequip 13 aviation regiments with Su-30SM, Su-34, Su-35S, MiG-31BM/BSM platforms; three army aviation (helicopter) brigades and six army aviation regiments were reequipped with Mi-28 and Ka-52 advanced attack platforms. Russian long-range air defense received a boost with 20 regiments being equipped with the S-400 *Triumph* AD system and 13 battalions received the *Pantsyr-S* short-range mobile AD system.¹² After years of test trials and delays in entering the production phase, the RFASF started to take the first serial production of Su-57 heavy multirole aircraft (previously known as T-50 PAK FA) in 2020. In May 2019, it was announced that the RFASF would acquire 76 Su-57, enough to arm three fighter regiments instead of the original plan for just a single squadron of 16 airframes.¹³

With respect to airpower, this conventional military objective is to be achieved through the application of the full spectrum of the RFASF, from fighters and AD for air superiority, to air support of ground and naval operations, and finally strategic deterrent operations carried out by the LRA in peacetime and in support the Strategic Rocket Forces for two of the three pillars of the nuclear triad. The second objective is power projection in pursuit of its irredentist and counter-systemic agenda as a “civilizational state,” which is the normative part of this objective. The material part is fulfilled through foreign basing and military interventions abroad, such as in Syria and elsewhere. This aspect is limited mostly to Syria, though in 2018 a base in Eritrea is in the works after a refusal from Djibouti; there are also unofficial interventions in Ukraine since 2014 and the Central African Republic in 2018, but as these do not officially involve the RusAF (and the RFASF), but rather paramilitary groups and private military contractors as proxies, they are beyond the scope of this chapter. More significant, though indirect, is the export of advanced military technology and expertise.¹⁴ Figures in the current Putin administration have remarked that Russia’s true comparative advantage globally is in the security sector, with the provision of advanced military equipment and the skilled personnel needed to either instruct indigenous militaries in operating it, as in the case of India, or outright operating it as military contractors, such as in Venezuela, where the regime’s AD network is largely operated in this fashion. Significantly, the export of specific advanced combat systems – most notably various variants of short-, medium-, and long-range AD, and shipborne tactical surface to surface missiles – represents a significant force multiplier for any other power that rejects the global status quo and seeks a certain degree of irredentism, as such systems have proven to have substantial value as conventional deterrents.¹⁵

In order to support these strategic goals, in practical terms the RFASF has a number of primary missions – air superiority and air defense, air support, armed and unarmed unmanned aerial operations, tactical and operational strike missions, aerial operations over maritime theaters, airlift and power projection, reconnaissance and targeting, communications, command and control, and strategic nuclear deterrence. The theoretical aspect of Russian military doctrine stresses

the integral interoperability of all branches to achieve grand politico-military objectives, and to exploit the gaps and weaknesses in enemy systems, tactics, and doctrine in order to compensate for potential quantitative and qualitative Russian weakness, while maximizing existing strengths, such as the comparative advantage in advanced and long-range AD systems like the S-300/400 variants. In conventional conflict, this resolves to three scenarios for air doctrine. In land warfare, the RFASF aims to gain air superiority over the area of operations, so that the flexible standard Battalion Tactical Group units can engage in maneuver warfare. In naval conflict, naval aviation units gain air superiority, or at least vastly degrade enemy air superiority operations, so that the trio of long-range aircraft, missiles, and submarines can achieve anti access/area denial (A2/AD) supremacy in the area of operations. Finally, as one of only three countries, alongside the US and China, to field both strategic bombers and cruise missiles, air power projection can be implemented, such as in Syria, through long-range strategic bombardment by the LRA. Air superiority depends on multirole fighter aircraft, the mainstay of which is the capable Sukhoi Su-27/-30/-35 heavy platforms and its various modernized and upgraded derivatives, and lighter MiG-29/-35 tactical aircraft. For the more specific mission of high-altitude bomber/missile carrying aircraft and cruise missile interception, especially over Russian national airspace, there is also the MiG-31 (over 250 in service and expected to remain so until past 2030), the supersonic interceptor and upgrade of the highly advanced Cold War era MiG-25. Unlike NATO's most recent Joint Air Power Doctrine, which stresses the responsibility of multirole fighters in gaining air superiority, with little thought to AD beyond short-range point defense, Russian air doctrine instead emphasizes the organic cooperation between aircraft and wide-ranging AD for gaining air superiority.¹⁶ The focus of AD is large numbers of surface-to-air missile platforms with variable ranges, from the short-range *Pantsir* to the long-range variants of the S-300/400, acting in an area denial role (A2/AD) to prevent the effective use of adversary aircraft, and therefore prevent them from gaining air superiority and engaging in combat support missions, while granting Russian aircraft a more even footing in combat operations.¹⁷

Air support and unmanned aircraft are another side of the RFASF's primary missions. Air support from the RFASF by fixed-wing and rotary aircraft is integral to the army, providing direct fire support, mobility, and operational and strategic lift capability.

Due to ongoing modernization, the RFASF is able to field several capable designs in the close air support role, including the multipurpose Su-34, intended to aggregate the capabilities of the mid-range Su-24 and long-range Tu-22M3, the venerable Su-25 (undergoing capability upgrade to the Su-25SM3 variant), and attack helicopters such as the Mil-24 and more modern Ka-52.

Besides receiving new and modernizing existing traditional air combat and support systems (fixed wing and rotary aircraft) the Russian military is actively acquiring a growing range of UAVs, predominantly for reconnaissance and targeting combat missions. The once neglected essential element of modern battlespace environment is now receiving high priority with the Russian MoD.

UAV operations are closely linked to the air support mission, as they provide an invaluable tool for wide-ranging real-time battlefield reconnaissance and targeting, and therefore a real-time flow of information, part of Russia's growing capacity to operate in a network-centric combat environment. Adding to that, UAVs may also be used for cyber and psychological operations. After lagging behind other major military powers in the development and fielding of UAVs, Russia is rapidly catching up with respect to unarmed UAVs and has fielded them in numbers and with significant operational impact in combat operations since 2014.¹⁸ In late 2018, the Russian military operated over 1,900 UAVs, designed for predominant tactical reconnaissance and targeting missions.¹⁹

Operational activity of the RFASF is also in the increase. While Russia's campaign in Syria has contributed to the increase of Russian aerial operations, further intensification of combat training, aerial patrols along the immediate defence perimeter (national border proximity), out of area patrols, transport operations and others played significant roles as well. Some missions, such as air superiority, close air support, and unmanned operations, have been prominent in the conflict in Syria; as Russia has rapidly rotated personnel to Syria throughout its armed forces, RFASF personnel have widely gained invaluable combat experience in these missions, flying in support of Russian and allied Syrian government and tribal forces, including long-range missions carried out by elements of the LRA directly from Russian territory.

The conflict in eastern Ukraine has also provided combat experience, though of a less well-publicized nature. The onus there has been on the effective use of AD to suppress adversary airpower, and on the extensive use of unmanned aircraft for reconnaissance, cyber and psychological operations, and directing (including automated) indirect fire from artillery; in particular, unmanned aircraft have substantially increased the value of counter-battery fire, and UAV-directed artillery, rather than separatist tanks or anti-tank missiles, is responsible for a substantial majority of Ukrainian armor losses in the conflict.²⁰ Furthermore, it has demonstrated that AD is a tremendous force multiplier for proxies in so-called "hybrid warfare," and such deniable proxies have the potential to fill the manpower gap that is the result of ongoing professionalization of the RuAF.²¹

Russian air power in Pacific Asia: organization and the ongoing modernization

Russia's modern air capability of the Far Eastern MD (*Vostochny Voennyi Okrug*)/Operational–Strategic Command East (*OSK Vostok*) represents a key tactical and long-range striking element of Russian military power east of the Urals. Its primary peacetime and wartime missions include achieving and maintaining air superiority; delivering effective air to ground support, including against maritime targets; strategic strike (LRA); multi-echeloned AD of key strategic assets, main population and industrial centers; long-range patrol, surveillance, and strike capability; theater to theater and out of area transport operations;

reconnaissance and electronic counter-measures; search and rescue; and environmental monitoring.²²

Russian air and AD power assigned to the Eastern MD is organized in a single operational-strategic formation (army), the 11th Air Force/Air Defense (AF/AD) Army. It is responsible for defending a total of 11 administrative regions of Russia in eastern Siberia and the Far East as well as over 22,000 km of land and maritime borders. The Eastern MD has a massive operational area of responsibility in spatial terms, as well as a complex regional threat environment. Therefore, a qualitative leap in air power and AD assets of the RFASF in the region is a key priority for the Russian MoD.

In August 2015, RFASF elements, including area and theater AD, which have previously formed the 3rd Air Force and Air Defence (AF/AD) Command, were reorganized in the 11th AF/AD Army.²³

Organizationally, the 11th AF/AD Army comprises one Air Composite Division (the 303rd), three AD divisions (25th, 26th, and 93rd), one independent AD brigade, three fixed-wing aircraft regiments, one helicopter brigade and two helicopters regiments, and other units. Adding to that, the Pacific Fleet Naval Aviation (PFNA) comprises several regiments and squadrons of fixed-wing and rotary aircraft. LRA elements deployed east of the Urals are formed in one heavy bomber division spread across two principal strategic bomber air bases in Ukrainka (Amur province) and Belaya (Irkutsk region). In late 2019, the combined strength of the 11th AF/AD Army was about 600 fixed- and rotary-wing aircraft, including LRA and PFNA units. RFASF units stationed in the theater are equipped with fourth-/four generation plus platforms, including MiG-31, Su-24, Su-25, Su-27, Su-30, Su-32, Su-34, and Su-35S aircraft and their variants.

Critical analysis of modernization trends of the 11th AF/AD Army reveals that the emphasis has been on achieving and maintaining air superiority and effective airborne fire support, by rearming all fighter and tactical strike aircraft units, plus all helicopter formations with a new line of advanced multirole platforms. Between 2013 and 2017, the Eastern MD was receiving approximately 50 new fixed-wing and rotary aircraft on average annually. High tempo of commissioning new airframes and recommissioning some modernized systems and platforms allowed the Russian MoD to significantly upgrade the overall combat

Table 1.2 Distribution of advanced and modern combat systems within the RFASF, 2017

<i>RFASF Army</i>	<i>Fixed wing aircraft, %</i>	<i>Rotary aircraft, %</i>	<i>AD systems %</i>	<i>Total %</i>
11th AF/AD Eastern MD	34	78	31	48.5
14th AF/AD Central MD	26	35	29	32
4th AF/AD Southern MD	41	37	80	50
6th AF/AD Western MD	48	54	45	48

Source: Aleksandr Tikhonov, "Armiya – Gordost' Rossii" [The Army is Russia's Pride], *Krasnaya Zvezda*, February 27, 2017.

potential of the 11th AF/AD Army, also in comparison with other major formations of the RFASF (Table 1.2).

As a result, the RFASF was able to fully rearm major combat units of the 11th AF/AD Army:

- Between 2014 and the end of 2016 the 22nd (Central Uglovaya airbase near Vladivostok) and the 23rd (Dzemgi air base, Khabarovsk region) fighter regiments of the 303rd Air Composite Division of the 11 AF/AD Army were reequipped with Su-35S and six Su-30M2 advanced superiority aircraft (23rd was reequipped fully, whilst the 22nd received one squadron [14 aircraft] throughout 2016);
- Some fighter units of the 303rd Division received over 30 MiG-31BM/BSM long-range interceptors (all MiG-31s were refitted to the BM/BSM variants);
- By 2015, the 120th Air Regiment (Domna airbase, Transbaikal region) received 24 Su-30SM, which replaced aging MiG-29s;
- In 2016–17, the 277th Bomber Regiment of the 303rd Air Division (the Khurba air base near Komsomol'sk-na-Amure) received a full regimental complement of 24 Su-34 *Pullback* intermediate-fighter bomber aircraft;
- In 2015–18, the 18th Army Aviation (helicopter) brigade (former the 573rd army aviation air base (Chernigovsk, Maritime Province) and the 319th Helicopter Regiment (former the 575th army aviation air base (Khabarovsk)) were reequipped with Ka-52 *Alligator*, Mi-8AMTShSch *Terminator* multirole helicopters, and Mi-26 rotary heavy lifters.

By late 2019, RFASF units deployed in eastern Siberia and the Far East received some 300 new fixed-wing and rotary airframes, which represents one of the most significant air power capability upgrades in the Indo-Pacific in the second decade of the twenty-first century. Adding to that, ground force and railways troops units, and the Russian Pacific Fleet (RUSPAC) units continue to be equipped with a variety of tactical unarmed UAVs. Forces of the Eastern MD operate the following UAV models adopted by the Russian military: *Orlan-10*, *Eleron-3*, *Granat-4*, *Takhion*, and the *Leer-3*.

Achieving and maintaining both air superiority and deploying a multi-echeloned defensive posture against any aerial targets is well understood by Russia's General Staff and its regional command. In regards to upgrading AD capability, a major thrust goes to fielding new-generation medium to long-range AD systems around principal naval bases as well as upgrading tactical AD capability of army units, part of the overall capability overhaul of core army formations. The most noticeable improvements include:

- Between 2014 and 2018, four AD regiments based near Petropavlovsk-Kamchatskaiy, Vladivostok, and in Khabarovsk region were fully reequipped with the S-400 *Triumph* advanced long-range AD system and the *Pantsir-S* mobile short-range AD system;
- In 2014, AD units of the 59th and 60th motor rifle brigade (bde) of the 5th Army were reequipped with 9K331MU *Tor-M2U* SAMs;

Table 1.3 Russian air power and air defense element of the Eastern MD, 2019

11TH AIR FORCE & AIR DEFENSE ARMY, PFNA AND LRA

FORCES BY ROLE

STRATEGIC BOMBERS	4 regt with 36 Tu-95MS <i>Bear H</i> , 40 Tu-22M3 <i>Backfire M</i>
FIGHTER	1 regt with MiG-31BM/BSM <i>Foxhound</i> ; Su-27SM <i>Flanker</i> ;
GROUND	Su-30M2 <i>Flanker H</i> ; Su-30SM <i>Flanker H</i> ;
ATTACK	Su-35S <i>Flanker E</i>
	1 naval regt with MiG-31BM/BSM <i>Foxhound</i>
	1 regt with Su-30M2; Su-35S <i>Flanker E</i>
	1 regt with Su-30SM <i>Flanker H</i>
GROUND	1 regt with Su-34 <i>Fullback</i>
ATTACK	1 regt with Su-25SM/UB <i>Frogfoot</i>
ISR	1 sqn with Su-24MR <i>Fencer E</i>
TRANSPORT	1 rgt with An-12 <i>Cub</i> /An-26 <i>Curl</i> /Tu-134 <i>Crusty</i> /Tu-154 <i>Careless</i>
MULTIROLE	1 bde with Mi-8AMTSH <i>Hip</i> ; Ka-52 <i>Hokum B</i> ; Mi-26 <i>Hilo</i>
HELICOPTER	1 rgt with Mi-8AMTSH <i>Hip</i> ; Ka-52 <i>Hokum B</i>
	1 rgt with Mi-24P <i>Hind</i> ; Mi-8AMTSH <i>Hip</i>
	1 naval sqn with Ka-29 <i>Helix</i>
AIR DEFENSE	4 bde with 9K317 <i>Buk</i> -M1-2/M2 (SA-11 <i>Gadfly</i> /Sa-17 <i>Grizzly</i>);
	1 bde with S-300V4 (SA-23 <i>Gladiator/Giant</i>)
	2 regt with S-300PS (SA-10B <i>Grumble</i>); 1 rgt with S-300V
	(SA-23 <i>Gladiator/Giant</i>)
	4 regt with S-400 (SA-21 <i>Growler</i>); 96K6 <i>Pantsir-S1</i>
	(SA-22 <i>Greyhound</i>)

EQUIPMENT BY TYPE

FIXED-WING	FTR/FGA	136+ TOTAL
AIRCRAFT		36+ MiG-31BM/BSM <i>Foxhound</i> ^a
		4 Su-27SM <i>Flanker</i>
		6 Su-30M2 <i>Flanker H</i>
		30 Su-30SM <i>Flanker H</i>
		24 Su-34 <i>Fullback</i>
		36 Su-35S <i>Flanker E</i>
	ATK	142 TOTAL
		32 Su-24M <i>Fencer</i>
		10 Su-24M2 <i>Fencer</i>
		60 Su-25/Su-25SM <i>Frogfoot</i>
	ISR	12 Su-24MR <i>Fencer E</i>
	TPT	32 TOTAL
		27 An-12 <i>Cub</i> /An-26 <i>Curl</i> ^a
		3 Tu-134 <i>Crusty</i> ^a
		1 Tu-154 <i>Careless</i>
		1 Il-20M <i>Coot A</i>

Continued

Table 1.3 continued

HELICOPTERS	ATK	66+ TOTAL
		40 Ka-52A <i>Hokum B</i> ; 20 Mi-24P <i>Hind</i> ; 6+ Ka-29 <i>Helix</i> ^a
	TPT	80+ TOTAL
		Heavy 6 Mi 26 <i>Halo</i>
		Medium 74+ Mi-8 <i>Hip</i>
	Long-range	S-300PS (SA-10 <i>Grumble</i>)
		S-300V/V4 (SA-23 <i>Gladiator/Giant</i>)
		S-400 (SA-21 <i>Growler</i>)
		9K317 <i>Buk</i> -M1-2 (SA-11 <i>Gadfly</i>)
		9K317 <i>Buk</i> -M2 (SA-17 <i>Grizzly</i>)
AIR DEFENSE* SAM	Medium-range	
	Short-range	96K6 <i>Pantsir</i> -S1 (SA-22 <i>Greyhound</i>)
AIRBORNE TROOPS		
FORCES BY ROLE		
MANEUVER	Air	2 air aslt bde
	Manoeuvre	

Sources: *The Military Balance 2019*, IISS; *Defence of Japan 2016*; *RIA Novosti* (issues 2016–20), *TASS* (issues 2016–20); *Krasnaya Zvezda* (issues 2016–20); data is collected by the author.

Note

a Part of the Pacific Fleet Naval Aviation order of battle.

- In 2015, the 18th MGA-Div received *Tor-M2Us*;
- In 2017, the 35th AD brigade was formed under the organizational structure of the 36th Army and its equipment with the 9K317 *Buk-M2* medium-range ADMS;
- In 2019, a newly formed AD brigade was equipped with S-300V4 long-range ADMS.

Improvements of a theater level AD is driven by the desire of Russia's MoD to be able to enforce A2/AD over core areas, either in response to possible security risks coming from neighboring DPRK, or long-term threats posed by the US and its regional allies, as well as China to the Russian Far East. Between 2019 and 2020, the rearmament of the 11th AF/AD Army will continue, though the pace may gradually slow down as the State Armaments Program until the year 2020 (SAP-20) comes to an end. It was expected that by the end of 2019, about 90 percent of the bomber force element of the 11th AF/AD Army would compose advanced or modern aircraft; over 70 percent of the Army's fighters would be advanced or modern air frames.²⁴

Apart from improving and expanding its organizational structure, upgrading its inventory and strike capability, the RFASF has initiated ground infrastructure upgrades. Over the next two years the Russian military will undertake significant

upgrades to key elements of ground defense, including naval bases and principal airfields. With respect to the Eastern MD these upgrades will include the Ukrainika air base (LRA) and the Step' airfield (Transbaikal region).²⁵ In particular, the Step' airfield received a 3,100 m long airstrip, allowing it to accommodate all types of Russian aircraft, including heavy lifters and strategic bombers.²⁶ With the airfield being strategically placed in a 100 km proximity to the Mongolian border and some 150 km away from the border with China, it is expected that together with the Ukrainika air base the upgraded Step' would enhance Russia's aerial power projection across Central Asia and deep into the Pacific. The reconstruction of both air bases was expected to finish by late 2019.

Adding to that, significant upgrades are expected within the Eastern MD's area of responsibility in the Arctic including upgrades of a naval facility on the Shmidt peninsula (Chukotka); Temp, Anadyr', and Tiksi airfields.²⁷ The aim of these upgrades is to establish a comprehensive network of AD, naval, and radar defense installations along the entire Northern Sea Route (NSR).

Major exercise activity

Over the past decade RFASF elements in Siberia and the Far East intensified their training, aerial operations, and patrols. The 11th AF/AD Army took part in all major exercise activities of the Eastern MD and the RUSPAC on par with engaging in independent operations and training. Between 2013 and 2019, the Eastern MD hosted three national level strategic maneuvers and snap check-ups. For example, during the strategic level snap check-up in July 2013, 30 MTA aircraft (An-124 and Il-76) transported 8,500 personnel, 415 items of heavy equipment, and 700 tons of supplies to the Eastern MD.²⁸ Between September 11 and 18 2014, the Russian military staged a strategic level snap exercise involving about 100,000 active personnel of both Eastern and Central MDs; then the 3rd AF/AD Command and the RUSPAC who were massed across the Far East and along key zones of Russia's Pacific coastline. The large-scale maneuvering of forces included the redeployment of over 100 combat and support fixed-wing and rotary aircraft, also with the aim to form formidable air strike groupings in the Far Eastern theater.²⁹

The *Vostok 2014* [East 2014] strategic maneuvers, which were carried out in September involved 650 aircraft.³⁰ One of the most significant features of the maneuvers was the massing of LRA elements in the Far East (about 50 strategic bombers), which demonstrated Russia's capacity to mass long-range strike capability in the Pacific maritime theater. In 2018, over 1,000 fixed-wing and rotary aircraft were actively involved in various stages of the *Vostok 2018* [East 2018] strategic maneuvers, staging over 240 different aerial and combined arms exercises, and carrying out over 800 sorties.³¹ Some 60 aircraft were redeployed from the Central MD to the Far East, indicating that units stationed in the Urals area are likely to be used as reinforcements in times of crisis and war.

Over the past decade RFASF elements in Siberia and the Far East intensified their training, aerial operations, and patrols. The 11th AF/AD Army took part in all major exercise activities of the Eastern MD and the RUSPAC on par with

Table 1.4 Largest Vostok exercises held in eastern Siberia and the Far East 2000–18

<i>Exercise</i>	<i>Year, month</i>	<i>Military districts, fleets, fighting services</i>	<i>Assets involved</i>
Vostok 2003	August 18 to 27	Far Eastern Military District; Pacific and Northern fleets; Ministry of Interior; Ministry of Emergencies Foreign forces involved: RoK, Japan	Over 70,000 personnel; 72 aircraft; over 60 warships and auxiliaries
Vostok 2010	June 29 to July 8	Far Eastern, Moscow, Trans-Volga-Urals, Siberian, Western military districts; Pacific, Northern, Black Sea fleets; Military-Transport Aviation (MTA); Airborne troops	About 20,000 personnel; over 5,000 items of heavy equipment; ^a 75 aircraft, over 40 warships and auxiliaries
Vostok 2014	September 11 to 18 (stage one: snapshot inspection of the Far Eastern MD) September 19 to 26 (stages two and three)	Eastern, Western, and Central military districts; Pacific Fleet; Long-Range Aviation (LRA); MTA; Airborne troops	155,000 personnel; some 8,000 items of heavy equipment, including 4,000 armored vehicles; 632 aircraft; 84 warships and auxiliaries
Vostok 2018	August 20 to 25 (stage one: snapshot inspection of the Far Eastern MD) September 11 to 17 (stages two and three)	Eastern, Central, and Southern military districts; Northern and Pacific fleets; LRA; MTA; Airborne troops Foreign forces involved: PRC, Mongolia	297,000 personnel; some 36,000 items of heavy equipment; over 1,000 aircraft; About 80 warships and auxiliaries

Note

a Items of heavy equipment include main battle tanks (MBTs), artillery pieces, AD missile systems (ADMS), trucks, radars and mobile communication complexes, major engineering heavy equipment and other.

engaging in independent operations and training. In 2018 alone, units of the 11th AF/AD Army continued intensive aerial activity and combat training. In particular, the Russian military reported that air units of the Eastern MD carried out over 9,000 combat training missions, including bombing raids, missile launches, and air gun fire training.³² PFNA flew over 7,800 hours, thus significantly exceeding their operational performance in 2017.³³ The overall number of flight

hours carried out by UAVs assigned to the Eastern MD exceeded 1,100.³⁴ By mid-2019, elements of the 11th AF/AD Army carried out some 30 various exercises and flew over 11,000 hours.³⁵

The Russian MoD plans to expand further its air power and AD capability in its Pacific sector by creating new units. In particular, it was announced that a second composite air division will be formed in the Eastern MD. The apparent formation of a second composite air division within the 11th AF/AD Army may lend credence to reports that the PFNA component will be strengthened by the reformation of the 865th Air Regiment equipped with MiG-31 long-range interceptors.³⁶

Out of area aerial operations

Russian MoD uses its long-range air power as another form of power projection and a demonstration of intent. Between 2013 and 2019, Russia LRA carried out over 190 aerial patrols.³⁷

Adding to an increased forward naval activity, the tempo of the RFASF is also very high in sustaining the country's strategic reach across the Pacific. Over the past five years the majority of Russia's forward aerial operations were held either in the vicinity of Japan, or along the US Pacific coast. Russian strategic bombers, including the Tu-95MS *Bear-H*, increased their operations following the escalation of the Ukraine crisis. Analysis of open source data reveals that between 2012 and 2016 RFASF aircraft were intercepted by the USAF eight times off the Californian coast or near the Aleutian Islands. Japan's Self Defence Force (JSDF) engaged in 1,599 intercepts of Russian aircraft over the same period.

Russian strategic aircraft also conducted prolonged patrols near Taiwan, over Southeast Asia, and as far as the US Island of Guam (four times). Russian patrols over the SCS were supported by Il-78 *Midas* aerial tankers operating from Vietnamese bases,³⁸ suggesting that Russia has once again regained special access to Vietnamese air facilities.

Russian aerial operations over the Pacific, including the SCS and adjacent areas, are being carried out in support of the nation's efforts to retain a degree of oversight over critical sea lines of communication (SLOC), and to project air power as a partial substitute for a reduced capacity to deploy sufficient naval power to areas of importance.

Since 2015, PFNA have been involved in long-range aerial patrols outside of Russia's immediate defense perimeter in the Pacific. In particular, in 2015–16 Il-38s based in Kamchatka staged aerial patrols in the vicinity of the Aleutian Islands.³⁹ This regularized practice continued in 2017 and can be expected to continue beyond.

In 2017, the operational tempo of the RFASF has increased: there were five reported intercepts by the USAF off the US Pacific coast, while JSDF carried out 337 scrambles since the beginning of 2017. The likely cause of such a high operational tempo was the escalation of tensions in the Korean peninsula, which led to the subsequent build-up of US offensive capability in the Sea of Japan.

Further intensification of Russian long-range operations can be expected in the near future, particularly with the continuous expansion of Russian air power capability east of the Urals, including the formation of a heavy bomber division.

In 2018 and 2019 Russian long-range aerial operations continued on a regular basis. In late July 2019, strategic bomber elements of the RFASF and PLAAF carried out their first joint aerial patrol: two Russian Tu-95MS and two H-6K strategic aircraft accompanied by airborne early warning and control (AWACS) aerial platforms staged joint aerial patrol over the Sea of Japan and East China Sea, thus signaling that regularized joint aerial operations in the theater are on the horizon.⁴⁰

Russian exports in the Western Pacific

Aside from the direct demonstration of airpower in terms of continued modernization, large-scale exercises, and incursions by Russian aircraft in the territorial airspace of Japan and the US, a significant but indirect impact of Russian airpower is the export of advanced Russian military technology and expertise around the globe. Russia is the second largest arms exporter after the US, while Russian technical capacity remains high and has recovered to a certain extent from the immediate post-Soviet period,⁴¹ and Russian arms retain a perception from potential buyers of ruggedness and sophistication.⁴² Over 40 percent of Russia's total arms exports continue to be directed towards the Asia Pacific defense market, with aircraft, aircraft engines, and AD systems dominating the portfolio of products acquired in Russia. For example, by 2019 Russia supplied about 280 various variants of the Sukhoi aircraft to key clients in Western Pacific and South Asia.

China

Rather than merely the presence of substantial air assets in the Eastern MD, it is possible to argue that a substantial part of the impact of Russian airpower on the Western Pacific is continued support for Chinese military modernization. China's PLAAF and PLANAF have grown and modernized, as air and space power are a fundamental part of Chinese modernization and essential to effectively contesting the United States Navy (USN) and USAF, as well as friends and allies of the US, up to the first and second island chains in the Western Pacific. However, elements of modernization still depend on Russian technology, especially in the field of aircraft power plants;⁴³ as an example, the J-11 and J-16, intended to be the mainstay multirole fighters of the PLAAF, are heavily based on the Su-27; and its export version, the Su-30MKK, ought to be powered by the indigenous WS-10A turbofan, but its reliability and performance have not matched that of the Russian AL-31 engine that initially powered the J-11, and continues to be used in that role. This is also the case for strategic lift, as the new heavy lifter Y-20 is powered by the Russian D-30, which delivers superior performance to the WS-18 engine that is itself intended to be a stopgap until development of the heavy WS-20 engine is complete, despite many delays.

Table 1.5 Export of Russian aircraft and AD systems to Indo-Pacific nations 2011–18

<i>Year of the contract signed</i>	<i>Country buyer</i>	<i>Platform/system</i>	<i>Quantity</i>
2011	PRC	Aircraft engines AI-31F	150
	PRC	Aircraft engines AI-31FN	123
	PRC	Aircraft engines AI-225–25F	250
	Laos	Mi-8MT helicopters	2
2012	India	Su-30MK1 multirole aircraft	42
	India	Mi-17V-5 helicopters	71
	Sri Lanka	Mi-171 helicopters	14
	Indonesia	Su-30MK multirole aircraft	6
	Myanmar	V-601/SA-3B SAM	50
2013	India	Mi-17V-5 helicopters	67
	Vietnam	Su-30MK2V multirole aircraft	12
2014	PRC	S-400 SAM	6
	PRC	Aircraft engines RD-93	100
	India	A-50EI AWACS aircraft	2
2015	PRC	Su-35 multirole aircraft	24
	India	Mi-17V-5 helicopters	48
	Bangladesh	Mi-8MT helicopters	6
	Myanmar	Yak-130 trainer aircraft	12
	Pakistan	Mi-35M helicopters	4
	Pakistan	Mi-8MT helicopters	2
2016	PRC	Aircraft engines AI-31F	unknown
	PRC	Aircraft engines D-30KP-2	224
	PRC	Be-200ChS amphibious aircraft	2
2017	PRC	Be-200ChS amphibious aircraft	2
	PRC	Be-103 amphibious aircraft	2
	PRC	Mi-171E helicopters	7
	PRC	Ka-32APVS helicopters	2
	PRC	Ansatz helicopters	5
	Bangladesh	Mi-8MT helicopters	5
2018	India	S-400 SAM	8
	India	Igla-S MANPAD	5,175
	Indonesia	Su-35 multirole aircraft	11
	Myanmar	Su-30 multirole aircraft	6
	Myanmar	Aircraft engines RD-33	16
2019	Laos	Yak-130 trainer aircraft	4

Russian provision of advanced technology has allowed the PLAAF and PLANAF to modernize at a greater rate than possible through purely indigenous efforts. The link between Moscow and Beijing will continue to contribute to Chinese militarism in its neighborhood, and therefore to drive militarization in states that perceive it as a threat, such as Japan, India, and the smaller states of East Asia, Southeast Asia, and even the Indian Ocean rim. Furthermore, the sanctions imposed since 2014 on Russia, combined with sluggish economic performance, are likely to increase the economic dependence of Russia on China,

especially with respect to the export of hydrocarbons and to investment in the sparsely populated and sometimes underdeveloped regions of Russia east of the Urals.⁴⁴ Though there is a preference in Beijing for eventually moving to an all-indigenous development and production of military hardware, for the time being Chinese belligerence will partly continue to depend on Russian know-how. Russia as an enabler of counter-systemic and irredentist foreign policy strategies is evident when considering the evolving security relationship between China and Japan or China and Taiwan. In neither case does Russia have a substantial interest in direct participation, but it does have the chance to arm the revisionist challenger – China – so that it may challenge a status quo power – Japan or Taiwan – which is dependent on the US. Especially in the case of the cross-strait dispute, the Russian way of air warfare has a particularly strong impact due to the A2/AD aspect. In the event of armed confrontation, land-based S-300 and derivatives batteries stationed in the Straits region would be able to not only significantly degrade the performance of the Republic of Korea Air Force (ROCAF), but to deny air access and support to its American ally. This pattern repeats itself in the wider context of the Western Pacific and the contestation between China and Japan.

Southeast Asia

Russia's role in this region is more varied than East Asia. The Organisation of Southeast Asian Nations (ASEAN) member states are potential customers for advanced airpower, especially the multirole 4th generation Su-30 fighter, and in the case of Vietnam, the S-300 as well. This is intended to balance against China's clear ambitions in the SCS, which encroach on the ASEAN exclusive economic zone (EEZ) in the Spratlys and Paracels despite international rulings in China's disfavor. The Southeast Asian market for Russian arms has grown to be a substantial one, with Vietnam accounting for the bulk of exports, and lesser shares for Myanmar and Indonesia, though there is also strong interest from Duterte's government, despite his administration's more Sino-friendly attitude as compared to its predecessors.⁴⁵

India

Russian indirect airpower is a prominent factor in India, China's great continental rival.⁴⁶ Existing tensions over the Arunachal Pradesh and Chinese backing for Pakistan have been exacerbated by China's rhetoric over the "string of pearls," which would be a string of deep-water ports that include Pakistan and Sri Lanka.⁴⁷

Russia has a long and productive relationship with India in many policy fields, including military; increasingly there is an ideational component as well, due to the struggle against radical Islam and the shared narrative of the "civilizational state."⁴⁸ Soviet, and later Russian expertise have been important drivers of Indian military modernization. There is a formal commission for military and

technical cooperation, and regular biannual tri-service INDRA wargames between the two powers. Joint projects, which include complete joint research and development, rather than technological transfer as from Russia to China, have resulted in successes for the India military and defense sector, including the BrahMos missile and the Su-30MKI fighter. Given India's rivalries with Pakistan and China, such joint projects are essential. The completely indigenous HAL Tejas light fighter project has been a relative failure, with only 16 deployed as of 2019, and the confrontation between India and Pakistan in March 2019, concluding with the downing of an IAF MiG-21, highlighted the dire state of Indian aviation stocks, which have been described as up to even 70 percent "vintage," meaning mid-Cold War aircraft such as the MiG-21, which have long since fallen out of use amongst other major powers, and are also less modern than Pakistani aircraft.

Conclusion

In the coming decades nations in the Western Pacific will continue to face an array of multifaceted security challenges. In the short and medium terms, asymmetric security challenges may range from globalized terrorism and transnational organized crime, to people movements and threats to border security. However, it is likely that asymmetric security challenges that dominated both regional security and to some extent defense agendas would gradually give way to growing risks associated with state to state geopolitical and military-strategic confrontation. The range of risks and threats posed by the growing state to state rivalry ranges from a confrontation in the cyber domain to territorial disputes; over display of military power; involvement in proxy conflicts and special operations campaigns (popularly known now as hybrid wars); proliferation of conventional and unconventional military technologies; and acceleration of military-technological competition (arms race).

Shifts in regional and global balances of power, and thus associated with that challenges to the international rules-based order, will represent the most significant strategic threat to the region. The strategic rise of Russia's power not just in Europe but also in Northeast Asia and the Arctic, qualitative enhancement of its strategic nuclear deterrent, rapid growth of Russia's conventional military power and power projection capability, and growing strategic tensions with the US and NATO all pose as a new set of strategic risks to the security of the US and its allies across Western Pacific.

The ongoing geopolitical fluidity, growing state of mutual mistrust, combined with accelerated strategic anxiety will keep pushing regional powers to invest heavily in national defense modernization programs. Leading regional powers across the region became one of the leading consumers of military technology, including air superiority capability, ground attack, and AD systems.

Despite decades of decline Russian national air power has preserved its status of being the world's second largest, and more lately, the world's second

most capable force. Russian national air power has retained its status of a formidable highly capable force with global power projection and strategic airlift capabilities.

Russian air force and AD units have received a massive capability upgrade, in case of AD/ABM/BMD the Russians achieved major qualitative leaps, acquiring, perhaps, the world's most comprehensive layered nation-wide integrated AD system. Air crews' training and operational activity has significantly improved and often matches similar levels of training received by pilots of western leading military powers. The Syria campaign has provided RFASF with opportunities to combat test almost all of its pilots and many AD operators. It also gave the Russian military an invaluable practice in sustaining an expeditionary operation in a remote theater by means of air and sea lift, where air power played one of decisive roles as a strategic enabler.

Russian air power east of the Urals has also undergone significant transformation. Between 2012 and 2019 units of the 11th AF/AD Army received a major capability boost, resulting in the most serious modernization outcome since the height of the Cold War confrontation. The fact is that Russia has successfully implemented one of the largest and most ambitious air power and AD modernization programs in Western Pacific over the second decade of the twenty-first century. Training and operational activity in also on the rise. The scope of Russian aerial operations have now been extended beyond immediate zones and stretch as far as Guam and Indonesia, California and Aleutian islands, to the Arctic, thus making Russian national air power a noticeable factor in the Western Pacific geostrategic context.

Notes

- 1 Adamsky, 2018.
- 2 Ambrosio, 2016.
- 3 Ministry of Defense of RusFed, 2014.
- 4 Kostyukov, 2018, pp. 118–122. Vice-Admiral Igor Kostyukov is the First Deputy Chief, Main Directorate of the Russian General Staff.
- 5 Sivkov, 2019, p. 5.
- 6 Defense Intelligence Agency, 2017.
- 7 Meijer et al., 2018.
- 8 Giles, 2017.
- 9 Burilkov, 2018.
- 10 Tsygankov, 2017a.
- 11 Kirchberger, 2016.
- 12 Shoigu, 2020, p. 1; Shoigu, 2019, p. 1.
- 13 Ramm et al., 2019, pp. 1–2.
- 14 Connolly, 2016.
- 15 Cordesman and Kendall, 2016.
- 16 Adamsky, 2010.
- 17 Giles, 2017.
- 18 Persson, 2016.
- 19 Avdeev, 2018, p. 3.
- 20 Giles, 2017.

- 21 Asymmetric Warfare Group, 2017.
- 22 The Pacific Fleet Naval Aviation would be responsible for additional specialized tasks and missions, which will be detailed in the Out of Area Aerial Operations section.
- 23 Tsygankov, 2015.
- 24 Tsygankov, 2019a.
- 25 Tsygankov, 2017b.
- 26 Kretsul and Ramm, 2018, pp. 1, 6.
- 27 Dragomirov, 2017, p. 6.
- 28 Tsygankov, 2013.
- 29 Lobkov and Hudoleev, 2014, p. 1. N.B. Russian Military Transport Aviation (MTA) staged about 30 sorties involving over 20 An-124 and Il-76 heavy lifters, An-26 and An-12 medium-range transports, which moved over 1,200 personnel and about 200 tons of cargo from European Russia to the theater. Lobkov and Tikhonov, 2014, pp. 1–2.
- 30 Gerasimov, 2014, p. 3.
- 31 Khudoleev, 2019, p. 6.
- 32 Tsygankov, 2018a.
- 33 Ministry of Defense of RusFed, December 23, 2018, P.S. By way of comparison, in 2017 PFNA flew over 7,000 hours. Lobkov, 2018, p. 4.
- 34 Tsygankov, 2018c.
- 35 Tsygankov, 2019b.
- 36 Mikhailov and Kozachenko, 2019, p. 6.
- 37 Tsygankov, 2018d. N.B. Between 2013 and the end of 2017 Russian strategic bombers carried out 178 patrols. Russian LRA staged over ten aerial patrols over 2018. Data was collected by the author.
- 38 Tsygankov, 2014.
- 39 Rossolov, 2017, p. 4.
- 40 Tsygankov, 2019a.
- 41 Blank and Levitsky, 2015.
- 42 Blank and Levitsky, 2015.
- 43 Kirchberger, 2016.
- 44 Kaczmarek, 2015.
- 45 Connolly and Sendstad, 2017.
- 46 Agnihotri, 2011.
- 47 Khurana, 2008.
- 48 Rekha, 2017.

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2 The People's Republic of China¹

Xiaoming Zhang

The rise of China as a global economic, political, and military power throughout the first two decades of the twenty-first century raises concerns for many policy makers, strategists, and scholars about Chinese military modernization – concerns that might provide a new perspective on global security for years to come. At the center of this concern is China's expanding air power capability and its impact on the Indo-Pacific region, causing countries to re-evaluate their own air force modernization needs.

At the turn of the millennium, however, the People's Liberation Army Air Force (PLAAF) still was an antiquated service outfitted with obsolete weapons systems and operated by personnel applying outdated employment concepts. Guided by China's 1998 military modernization "three-step" development strategy, today, the PLAAF has rapidly advanced its capacities and operational concepts to defend against perceived threats to national sovereignty and territorial integrity. This advancement includes a shift in the PLAAF's operational focus from territorial defense force to one that is capable of both defensive and offensive operations (*kongfang jianbei*) with integrated "air-space" (*kongtian yiti*) capabilities and the acquisition of advanced air superiority fighters, airborne and space-based C2 and ISR and platforms, long-range anti-aircraft and anti-missile systems, refueling aircraft, and heavy lift capabilities.

Given the fact that China was a country with a backward economy, lack of industrial infrastructure, and limited access to western advanced technology, the development of the Chinese air force was difficult and tortuous from the foundation of the People's Republic. This chapter provides an overview of the progress that the PLAAF has made toward becoming a powerful and modernized service over the past two decades with a focus on factors that appeared to play a significant role in shaping the PLAAF's organization, equipment, doctrine, and tactics to implement its concepts of air war. These factors include the influence of western thinking on air power, the lessons learned from recent foreign conflicts, the generational efforts to develop China's aerospace industry, and the perceived threat to China's national sovereignty and territorial integrity. The PLAAF still faces many challenges in reaching its development goals. Given the continuing growth of China's economic and military power in

the coming decades, the PLAAF will probably become an increasingly greater challenge to the United States and other powers in the Indian Ocean and Western Pacific.

Evolution of the PLAAF's thinking on air power

Chinese defensive thinking provided the doctrinal guidance for the development of the PLAAF since its establishment. From the outset, the PLAAF leadership preferred to build an air force that possessed more fighters than bombers. Their theory was that the role of fighters dovetailed well with the defensive cast of Chinese military thought. Bombers attacked enemy countries and territories – an aggressive act – but fighters were defensive in nature and, if successful in fending off attacks, would ensure air superiority.² More importantly, the early PLAAF leadership was composed of ground warfare veterans with a conviction that People's Liberation Army (PLA) ground forces could overwhelm stronger opponents and win any future war, with air power used to supplement the power of the army.³ They tended to discount military aviation as a potentially decisive element in warfare. This notion continued to be reinforced by the PLAAF's early combat experiences.

Throughout of the 1950s, the PLAAF fought against the United States Air Force in the Korean War, and the Nationalist Chinese Air Force over the Taiwan Strait. These combat experiences served as a driving force for the Chinese air force to further emphasize an air defense strategy and the development of fighter planes, radar, and ground anti-aircraft systems, while devoting only a small portion of the overall force structure to delivering limited air-to-surface ordnance. Accordingly, the PLAAF defined a set of operational principles that stressed the use of overwhelming force to achieve the protection of friendly forces and the destruction of enemy forces, as well as the subordination of military objectives to political ones through strict adherence to the central authority's operational policy. Preparing for the enemy's bombing attacks, the air force developed some counter-measures, including mental preparation, camouflage, quick repair, and the deployment of Chinese bombers to the region at risk in order to strike back. These principles eventually led the PLAAF leadership to believe that the use of air power was more for deterrence than for offense.⁴

By the 1970s, the PLAAF had become one of the world's largest air forces, two-thirds of which were fighters. Nonetheless, its equipment was outdated, limited in capability, and not even equal to that of some countries surrounding China. Since the creation of the PLAAF, China had favored an air force based on quantity instead of quality to address technological deficiencies and maintain the air force's overall combat capabilities.⁵ The sheer numerical superiority of the PLAAF compared to its potential regional opponents convinced the Chinese leadership that the PLAAF had built an adequate and credible air defense force capable of deterring and, if necessary, resisting any attack into China air space.

This belief was shattered by the dominant role that air power played in Desert Storm and the military conflicts since the 1991 Gulf War. The PLAAF was wakened to the realization that China had fallen far behind the West in both technology and doctrinal thinking about air power. For decades, the PLAAF was critical of Douhet's "command of the air" theory, contending that the Italian general exaggerated the role of air power in warfare.⁶ Air power played a dominant role in the post-Cold War conflicts, showing that time and space were no longer the allies of those who were once so confident that China's existing air defense systems could defeat any attacks deep into the nation's heartland. Serious doubts were raised about the traditional interpretation of China's defense capabilities, including the common belief that an inferior force could overcome a superior enemy. PLAAF researchers began to pay attention to Douhet's argument that "air arms is so essentially offensive in character" and its employment for defense "dooms ... absurdity" that a strong attacker could lose initiative.⁷ Drawing on lessons learned from Iraq's defeat in the 1991 Gulf War, the Chinese central military leadership pointed out that "a weaker force relying solely on the defensive would place itself in the position of having to receive blows," and that only by "taking active offensive operations" could the weaker force "seize the strategic initiative."⁸

Following such a line of thinking, the PLAAF began to ponder how to defend China's air space by implementing an air offensive strategy. Its personnel became very interested in Douhet's argument that "a weaker air force could also defeat a stronger enemy one provided it can compensate for the difference in strength by showing more intelligence, more intensity, and more violence in its offensive actions."⁹ During the years between the mid and late 1990s, PLAAF researchers advanced a new theory for the development of the Chinese air force that would be capable of both offensive and defensive operations simultaneously. Taking into account the defensive nature of China's national defense strategy, they believed that, while maintaining a necessary number of ground air defense forces, the PLAAF should possess an equal large portion of offensive and defensive aircraft, which could carry out not only air defense missions, but also offensive operations, including striking deep into enemy territory.¹⁰

Since 1993, Beijing has been increasingly worried about a potential confrontation with Taiwan, including a conceivable U.S. intervention. PLAAF strategists were fully aware that the U.S. Air Force could launch attacks on China from its bases in the West Pacific and even from those bases inside the United States. Both Desert Storm and Operation Allied Force demonstrated that military victories in these two wars were actually ascribed to the U.S. and its allies' overwhelming air superiority, as well as their information dominance.¹¹ The Chinese military leadership came to realize that the future warfare would be all dimensional involving land, sea, air, space, and electronics.¹² This understanding of modern warfare facilitated PLAAF strategists' discussions concerning how to develop its capability to engage in informatized warfare. For them, air offensive operations in a war to unify Taiwan with the mainland would depend on the PLAAF's electronic warfare capability. They, therefore, declared that the

development of the Chinese air force's offensive capability must include the development of integrated firepower and information systems (*huoli xinxi yiti*).¹³

The PLAAF's discussion of the role of informatization in modern warfare also drew its attention to space and space technology, which could play a critical role in the transformation of the Chinese air force from an air defense force to one capable of both offensive and defensive operations. According to one Chinese study, the military conflicts since the 1991 Gulf War revealed that future war would be conducted offensively by two sides in air and space. The publication of *America's Air Force Vision 2020* in 2000 further confirmed that "advanced integrated aerospace capabilities" would enable the air force to "find, fix, track, target and engage" and "information superiority will be a vital enabler of that capability."¹⁴ More importantly, PLAAF researchers noticed that many major air forces in the world had embarked on developing and incorporating integrated air and space capabilities.¹⁵

In March 1999, the Chinese leadership endorsed the PLAAF's new strategic vision, directing it to transform gradually from a homeland air defense force to one that was capable of both offensive and defensive operations with Chinese characteristics. Because China is a large country with many important targets to be protected, Chinese leaders believed that the only effective air defense was to destroy enemy attacking forces on the ground and at the sea. They charged the air force to "bear the brunt of, and be employed throughout the entire course" of the conflict, and "to complete certain strategic missions independently."¹⁶ Late that year, for the first time, the PLAAF set an ambitious goal to develop itself into a "strategic air force." The PLAAF adopted a three-step implementation strategy for air force development over the next several decades with a focus on building three operational systems: air offense, air and space defense, and airlift and airborne capabilities.¹⁷

At the end of 1997, China adopted a new modernization strategy for Chinese military, which would be implemented in three steps: to lay a solid foundation for the development of the PLA into a mechanized and informatized force by 2010; to accomplish mechanization and make major progress in informatization by 2020; and to reach the goal of modernizing national defense and the armed forces by the mid-twenty-first century.¹⁸ This constituted a logical follow-on to the strategic vision the PLAAF introduced in 2004, calling for the development of a long-range strategic air force and the active involvement of integrated air and space operations, with information and firepower systems.¹⁹ It was a two-stage transformation. The first stage lays a framework for a force capable of both offensive and defensive operations by increasing the number of high-performance offensive aircraft, combat support aircraft, and advanced surface-to-air missile (SAM) systems. The second stage welds fighter aircraft, surface-based defense, and command, control, communications, and intelligence elements into an integrated operational system able to conduct both air offensive and defensive operations under the conditions of information.

The development of China's air force capabilities focuses on four areas: (1) an offensive capability to protect security and national interests from the air and

space; (2) an integrated air defensive and anti-missile capability for monitoring and attacking objects flying in air and space; (3) a superior capability over its main opponents (presumably Taiwan) and a certain counter-information capability against its strategic opponent (presumably the United States); and (4) a strategic airlift capability to conduct both airlift and airdrop operations.²⁰

In the meantime, the air force weapon development should concentrate on offensive aircraft, air defense warning systems, and air refueling capabilities. The air force education and training programs should attach importance to the production of high quality personnel competent to serve in different leadership positions, skillful to fly and fight, and knowledgeable concerning innovation. The PLAAF should also improve its operational systems capable of conducting both offensive and defensive and information enabled operations supported by a highly efficient logistics system and a network of airfields and missile and electronic warfare positions. The most prominent difficulty faced by the PLAAF is the development of its information systems so that it is capable of carrying out systems-confrontation warfare.²¹

The PLAAF's quest for modern weapon systems

Despite the fact that the Chinese air force is increasingly becoming equipped with fourth- and fifth-generation weapon systems, this endeavor has been arduous and tortuous due to China's backward economy, lack of industrial foundation, and no access to western technology. China had to initially depend on the Soviet Union for the supply of aircraft and then on the reverse-engineered Soviet weapon systems to equip the PLAAF. By the end of the twentieth century, China manufactured more than 6,000 J-6 (Chinese-made MiG-19) and J-7 (Chinese-made MiG-21) aircraft.²² These aircraft were not only short range, but also short sighted. China's indigenous defense industry offered no immediate solution to achieve the PLAAF's strategic vision.²³ Nevertheless, huge investments and many years of experience in reverse engineering laid a solid foundation for the future development of China's aerospace industry.

Throughout the years, China pursued a "walking on two legs" policy to modernize the air force through purchases of foreign systems and the development of domestic technology. In the 1980s, China was able to import weapon systems from the United Kingdom (Rolls-Royce Spey MK202 Turbofan engines), France (AS365 Dolphin and SA321 Super Hornet helicopters), and the United States (UH-60 Blackhawk helicopters). One of the PLAAF's major efforts to acquire western technology was the Peace Pearl program, under which the U.S. firm, Grumman, would equip Chinese J-8 fighters with advanced avionic systems. The West imposed an arms embargo on China following the June 1989 event at Tiananmen Square. As a result, Beijing again turned to Russia for assistance. Beginning in 1992, China bought three batches of Su-27s – a total of 74 aircraft – along with their accessories. The Su-27 was one of the world's most modern aircraft and had a "state-of the art" weapon system, but had limited offensive capabilities as a fighter. The Chinese decided to purchase the

Su-27 because they were impressed by its aerobatic performance.²⁴ More importantly, for the Chinese, the purchase was not only a stopgap measure, but it also allowed them to acquire first-hand exposure to the latest technology of modern fighters.²⁵

Access to foreign equipment and technology helped the Chinese defense industry to develop indigenously designed aircraft. The JH-7 was the first product that resulted from an indigenous R&D program for new fighter-bombers, initiated in the late 1980s. It is outfitted with twin WS-9 turbofan engines (the Chinese version of the MK202 Spey), performing roughly equivalent roles of the European Tornado fight-bombers. The JH-7 first entered service in the PLA Navy Aviation (PLANA) units to carry out anti-ship missions in 1994. The improved variant, the JH-7A, entered service with the PLAAF in late 2004 with two upgraded, more powerful domestic-made turbofan engines, and a new fire control system capable of launching precision strikes using anti-radiation missiles and laser-guided bombs.²⁶ As part of a rapid replacement program, the PLAAF reportedly phased out the obsolete fleet of Q-5 attack aircraft by 2017. Nonetheless, the JH-7A is an aircraft based on outdated design, and unable to meet the PLAAF's new mission requirements. Allegedly, its production has stopped after nearly 270 aircraft have been made.

The PLAAF's most urgent need was for a multi-role single-engine fighter that could replace the large number of its obsolete J-7 fighters and Q-5 attack aircraft. After more than a decade of effort, the Chinese aerospace industry successfully developed J-10s with characteristics of fourth-generation jet fighters, powered by a Russian AL-31F-type engine. An early appearance of J-10 showing certain exterior features of the cancelled Israeli Lavi fighter drew suspicions concerning possible cooperation between Beijing and Tel Aviv. In fact, during its 18-year development period, there was at least one major redesign from the initial conventional design as an air-superiority fighter to the latest semi-stealthy layout as a multi-role fighter. The first batch entered service early in 2003. Since then, J-10 has been continuously upgraded with enhanced fourth-generation electronics, including both passive and active electronically scanned array (PESA/AESA) radars and a Chinese made WS-10 turbofan engine, currently known as the J-10B/C. The upcoming upgrade for J-10 is a new WS-10B3 turbofan engine with a stealth sawtooth thrust vector control (TVC) nozzle.²⁷ Up to 350 J-10s of different versions are currently in service with the PLAAF and PLANA.

The Chinese were not totally satisfied with their initially acquired Su-27s, which could not carry out long-range ground attack missions with precision weapons and had inadequate flight ranges. In 1999, China concluded a \$1.85 billion contract with Russia to purchase 38 Su-30MKK fighter-bombers with upgraded avionics, larger weapon payloads, and air-refueling capabilities. It later placed two additional orders of 38 aircraft for the air force and 24 Su-30 MK2s for the PLANA. The acquisition of these new Russian-made fighter-bombers empowered the PLAAF with real long-range strike capabilities. However, Beijing's policy has historically put the accent on self-reliance for

military production through either reverse-engineering or incorporating foreign technology. The Sukhoi transaction enabled China to manufacture twin-engine heavy fighters itself. In 1996, China entered into an agreement with Russia on the license production of 200 Su-27s at the Chinese aircraft factory in Shenyang. This inaugurated China's production of Su-27 aircraft under the name of J-11 and later J-11A.²⁸

Beginning in 2004, building on Sukhoi technology, the Chinese commenced the production of J-11B with their own technology, including the indigenously produced WS-10A engines, new radars, avionics systems, and air-to-air missiles. These improvements enabled the J-11B to outperform the Russian-made Su-27s. Currently, a further improved variant – J-11D – with a new AESA radar and upgraded WS-10 engines has been under development. What the PLAAF values the most is the indigenized version of Su-30MKK under the name of J-16. This heavy multi-role fighter/fighter-bomber is outfitted by a more powerful AESA fire control radar, a greater weapon load, a longer range, and the capability of carrying a variety of indigenous guided weapons for air-to-air, air-to-ground, and air-to-sea missions. Since 2015, it entered the service with the PLAAF, and is steadily constituting the main strike capability of Chinese air force. Meanwhile, an EW Wild Weasel variant of J-16 is under development, equivalent to the American EA-18D.²⁹

While engaged in employing foreign technology, China has also concentrated on independent R&D to develop a series of 20s' military aircraft, including the J-20 stealth fighter, the heavy-load transport aircraft Y-20, the medium helicopter Z-20, and the long-range strategic bomber H-20. Except for bomber H-20, which is of a four-engine stealth flying wing design similar to the American B-2 which is expected to take a maiden flight by 2020, both the J-20 and the Y-20 had their maiden flights in 2011 and 2012, respectively. The Y-20, based upon some Il-76MD technology, appears similar to the US C-17, and is expected to provide the PLAAF with long-range heavy airlifting capability. Moreover, the Y-20 has provided the platform for the development of a tanker (Y-20U) for the PLAAF's fighter and fighter/bomber fleets. The J-20 is a truly meaningful fifth-generation fighter, allegedly competitive with the American F-22. Both aircraft were handed over to the PLAAF for operational testing and evaluation in 2016. Currently, Y-20A is under mass production, and J-20 has entered service with the operation units of the PLAAF. The Z-20, a Chinese version of the American S-70C, has entered the limited service with the PLA Army in 2018.³⁰

For China, the J-20 is set to break the Western monopoly. The aircraft reveals many design features and capabilities that the F-22 and the F-35 have. There has, however, been criticism that the aircraft was underpowered by Russian engines. Since early 2017, the J-20A prototype has been fitted with Chinese indigenously made WS-10C turbofan engines with sawtooth-edged nozzles, suggesting that China has already developed more advanced engines to replace Russian engines.³¹ According to the aircraft chief designer, this fifth-generation fighter is characterized with three prominent features: stealth, long-range strike, and informatized fighting capabilities.³² The PLAAF is very satisfied with the

J-20's handling and combat awareness systems and competitive aerodynamic performance, believing that the overall performance of the aircraft will continue to improve in the coming years as more powerful WS-15 engines with TVC capability become available.³³ More significantly, this success is steadily closing up the technological gap between China and the West. Reportedly, Chinese chief aircraft designer, Yang Wei, acknowledges that the Chinese aerospace industry has already embarked on the development of the sixth-general fighter, which will be expected to fly in 2035.³⁴

As to the improvement of the PLAAF's long-range strike capability since the early 2000s, China took an expedient approach by focusing on the development of the H-6 medium bomber as a cruise missile carrier despite that the aircraft was based on the Russian-made Tupolev Tu-16. A major achievement was made in 2007 when Chinese engineers fitted the H-6 with two Russian D-30KP-2 turbofan engines (and then the Chinese reverse-engineered WS-18), which enable the H-6K to have a greater range and a higher cruise speed. Moreover, its avionic system has been significantly improved. The aircraft is equipped with a large ground scanning radar with interrupted synthetic aperture radar (SAR) and terrain following/terrain avoidance (TF/TA) capabilities and a chin electric-optical turret containing forward-looking infrared (FLIR), charge-coupled device (CCD) TV camera, and a laser designator for night/poor weather missions. Other improvements include electronic countermeasure (ECM), missile approach warning system (MAWS), radar warning receiver (RWR)/ECM, and satellite communication (SATCOM) systems. Its cockpit has been completely redesigned featuring six color MFDs, with only a three-member crew to fly it. H-6K is capable of flying both conventional and strategic bombing missions. The aircraft can carry up to 36 250kg unguided bombs under the six large wing pylons for carpet bombing, and also can launch six cruise missiles with range from 1,500 to 3,000 kilometers. The H-6K currently serves as a gap-stop until H-20 becomes available.³⁵ More importantly, since 2019, the PLAAF has flown the inflight refueling capable H-6N by carrying a single large ballistic missile to launch strategic strike even a possible nuclear one.

Since the beginning of the 2000s, the development of sophisticated command, control, and communications (C3) and intelligence, surveillance, and reconnaissance (ISR) capabilities has been the PLAAF's most urgent priority. After Israel cancelled the sale of the Falcon airborne early warning and control system (AWACS) to China in 1999, China had pulled together sufficient talent and resources to build its own system under the name of KJ-2000, based on the Russian Il-76MD airframe. It has been alleged that China's radar technology used by the KJ-2000 had reached the same level as that of leading foreign countries and that, in some areas, it is even better.³⁶ However, only four KJ-2000s were produced due to limited quantity of Il-76MD available. Simultaneously, China launched a High New (Gaoxin) project to develop a series of AWACS and electronic warfare (EW) aircraft based on first Y-8 and then Y-9 turboprop transport platforms. There are a total 12 types of such aircraft, of which is a medium-sized AWACS – KJ-500 – carrying a new digital radar with the same capability of

KJ-2000, SATCOM system, and additional electronic intelligence (ELINT) antennas. Both the PLAAF and PLAN received this aircraft in 2014 and 2015 respectively. Presently, its mass production is under way. The PLAAF has more AWACS and EW capabilities than ever before.³⁷

The use of unmanned aerial vehicles (UAVs) or combat drones (UCAV) for real-time surveillance and strikes in Afghanistan and Iraq also gave new birth to the PLAAF's UAV program. Several models of UAVs slowly but steadily have entered the service with the PLAAF. The most prominent machine is the GJ-2 Wing Loong II similar to the American Q-1 Predator/Q-9 Reaper and powered by a turboprop engine with 20 hours flight endurance. It has 12 weapon hard-points capable of launching various GPS/laser/IR guided air-to-air, air-to-surface missiles and bombs. Besides Wing Loong, a long-range semi-stealth UAV called EA-03 powered by a domestically made turbofan engine has entered the service with the PLAAF. It has a head bulge housing a SATCOM, FLIR, and TV cameras, and is expected to fly long-range reconnaissance and EW missions. The evidence suggests that the EA-03 was deployed to Tibet during the 2017 Doklam standoff with India, as well as Hainan Island and the Chinese-North Korean border in early 2018.³⁸ While outsiders are speculating how the Chinese aerospace industry is developing stealthy flying wing UAVs,³⁹ the two most notable UAVs – GJ-11 and WK-8 – were unveiled during the military parade celebrating China's 70th anniversary on October 1, 2019. The former is capable of flying missions with J-20 similar to the American XQ-58A Loyal Wingman project. The latter, similar to the American D-21, can be launched by the H-6 carrier to conduct strategic reconnaissance mission, and allegedly it has already flown secret missions near Taiwan as well as the disputed Senkaku Islands in East China Sea.

All these weapon systems that enter service will represent a key step closer towards China's goal for building a strategic air force. In the coming years, the fleets of J-10Cs, J-16s, J-20s, Y-20s, and UACVs will greatly improve the PLAAF's offensive and defensive capabilities, as well as the rapid nonstop reach capability across both theater commands and continents. Some of these aircraft will also provide new platforms for the PLAAF's electronic and informatized war capabilities. Moreover, China's own ability to manufacture modern military aircraft will prevent the PLAAF from depending on foreign supplies to meet its urgent needs, and thus avoid another dilemma like the one it faced in 2008 when Russia failed to deliver 34 Il-76MDs as scheduled.

The PLAAF's 2017 organizational reforms

The Chinese military system had long consisted predominantly of ground forces and was accordingly organized under the influence of army-centric thinking. The PLA's four general departments – the General Staff Department, General Political Department, General Logistics Department, and General Armament Department – served as the headquarters for all services, namely the ground force, navy, air force, and the second artillery force. The departments were

staffed primarily by army officers. Military regions served as the command organization for ground troops, and only played a concurrent leadership role for the personnel of other services located within their regions during the wartime. Ground force officers commanded the military regions, and the commanders of the other services could only serve as their deputies. Since there was no permanent joint organization at the military region level, when a joint command organization must be formed, air force officers could only assume assistant (hence subordinate) positions.

Since its inception, the PLAAF has been organized along military region lines with four departments as its headquarters and an operational command in each military region. It has combined aviation with ground-to-air defense forces, consisting of the aviation, SAM, and anti-aircraft artillery (AAA), and airborne units, as well as communications, radar, electronic counter-measures (ECM), chemical defense, technical reconnaissance, and other specialized elements. These units followed the hierarchy of division, regiment/field station, group/battalion, and squadron/company. The PLAAF's organizational structure had multiple components and layers, many of which overlapped, spawning redundancies. Despite reorganization and restructure due to force reduction over the years, the traditional organization structure of the PLAAF remained intact.⁴⁰

In the early 2000s, air force personnel began to argue that the existing organizational structure had seriously impeded the development of the combat effectiveness of the Chinese air force. They requested Chinese military authorities to consider reorganizing the PLAAF into functional air commands, separating the air force from the PLA military regional system and thus making it a truly independent service. Some even recommended that to be a more offensively oriented air force, the PLAAF should follow the US Air Force's "expeditionary force" model and organize air force units into air strike groups with mixed fighters, bombers, and EW aircraft.⁴¹ Most people believed that a reorganization should focus on: (1) proportionally increasing offensive components, while adding the new type of troops equipped with high technology to optimize the force structure; (2) reducing command levels, while developing a flat hierarchy in command and control; (3) streamlining headquarters organizations by cutting officer billets and support personnel, while increasing the employment of NCOs and civilians; (4) reorganizing air force universities and scientific research institutes; and (5) centralizing logistic support system by trimming down redundancies and moving toward a joint system for all services.⁴²

Beginning in 2011, the PLAAF embarked on a new round of experimental reforms by creating a new deputy corps-level command and control structure known as base (*jidi*). Four of them were initially created to command brigade-sized aviation, SAM/AAA, radar, and EW units responsible for commanding multiple air components and coordinating air-ground operations in the battles. Several air divisions were reorganized into air brigades, each of which has four or five flight groups, one maintenance group, and four airfield support battles. The PLAAF believes that this two-tiered command system (base-brigade) is more capable of commanding and coordinating dissimilar aircraft and air-ground

training, as well as combat operations.⁴³ Meanwhile, the PLAAF created an additional transport division and three special aircraft divisions, attempting to enhance its long-range airlift and airborne early warning and control and electronic warfare capabilities.

It was not until the end of 2015 that the PLA undertook a major overhaul of its command and control system. Four general departments were downgraded and reorganized into 15 functional departments and offices of the Central Military Commission (CMC), China's highest command authorities. Simultaneously, a Strategic Support Force (SSF) was created responsible for developing and employing most of the PLA's space, cyber, and electronic warfare capabilities. One main function of the SSF appears to be the operation of satellites to provide the PLA with command and control, communications, computers, intelligence, surveillance, and reconnaissance capabilities. The PLAAF made a similar reorganization with the abolishment of the old department system – Headquarters, Political, Logistics, and Equipment and with the replacement of several functional departments and offices. The most prominent change is the creation of the PLAAF's staff department. Five new theater commands that replaced military regions are created to command ground, naval, air, and rocket forces assigned to their theater to do operations. The military services are only responsible for organizing, training, and equipping units.⁴⁴

The PLAAF's command hierarchy has been shrunk from five levels (air force, military region air force, air corps, division, and regiment) to three levels (air force, theater air force, and air units). The base-brigade system has become an important part of the air force's new command structure. Since 2016, additional seven bases (a total of 11) have been established across the country. A recent *PLA Daily* article reveals that each of the air force bases serves as a combined arms command for military campaigns in a particular theater direction. It is also responsible for conducting air force combined arms operational training, as well as joint exercises with foreign air force. These training and exercises enabled the air force to verify the performance of varieties of new weapon systems, to study air offensive and joint air defensive techniques and tactics, and to enhance the base-brigade leaderships and command system with combined operation capabilities.⁴⁵

After several years of experiment, in 2017, the PLAAF finally began to reorganize its aviation, SAM, radar, and airborne forces into brigade-sized units. Except for bomber, transport, and special type (AWACS and EW) divisions, all fighter and fighter-bomber divisions have been dismantled with upgrading their regiments to brigades, including the retirement of earlier generations of aircraft and the deployment of new generation combat aircraft and ground-to-air missiles. In addition, new air search and rescue, special type aircraft, and UAV brigades and regiments have been created. This restructure has also straightened out the logistics support relationship between the field stations and air regiments. The former used to be an independent logistics support unit subordinated to the air division serving as the logistics support organization for the latter. This structure often involved the leadership at the division level to intervene to coordinate

the support issues between them. The placement of the field station directly under the air brigade has improved logistics support for flight operations and training. Moreover, the field stations are correspondingly transitioning to be capable of supporting different types of aircraft.⁴⁶

One challenge that the PLAAF is facing is that with more and more advanced fourth- and fifth-generation aircraft entering service, its support system based on the traditional field station system will be apparently outdated, inefficient, and ineffective. There are only a few PLAAF airbases capable of serving as a home base for more than one air brigade-sized unit and to support multi-type aircraft. High costs and complex technologies for maintenance of the state-of-the-art aircraft require the PLAAF to create a new support system for the supply of materials and equipment to tenant air units at the airbase. Moreover, modern air warfare expects an airbase to be large enough to simultaneously operate dissimilar types of aircraft in a timely manner. However, the existing PLAAF airfields are too close to big cities and consequently are almost impossible to expand. The recent years of urbanization and the ongoing city development have created serious challenges for the PLAAF to operate in both limited air and ground spaces.

As of today, it is not yet clear how the PLAAF has made itself air and space integrated. In earlier discussions on the importance of the concept of integrated air and space, PLAAF researchers insisted that an air force supported by space assets would be capable of not only carrying out air defense and anti-missile operations, but also launching large-scale air attacks, as well as long-range precision strikes against enemy bases. They advocated that the air force's establishment system must include space force or ground station troops that receive information from space to serve the space-enabled, networked operational force.⁴⁷ Nevertheless, the PLA's space assets or strategic missiles are controlled by the newly created SSF and PLA Rocket Force, respectively. Currently, the PLAAF appears to be concentrating on building facilities and installing systems on aircraft to receive satellite services for communication, weather navigation, and global positioning. This perhaps has been the only way for the PLAAF to make the transition from being a traditional air force to one enabled by space-based information (communication, positioning navigation, timing, and intelligence, surveillance, and reconnaissance) capabilities.⁴⁸

The PLAAF's preparation for modern warfare

One ultimate objective of the ongoing military reform is to enhance the PLA's ability to carry out joint operations in modern warfare. The PLA has not fought a war for more than 30 years, resulting in an increasing lack of warfighting awareness and capabilities. Meanwhile, China has faced growing security challenges conventionally and non-conventionally, especially along its maritime periphery, in the areas separated by the first island chain between the East China and South China Seas. Domination of the skies over these two seas would give China a decisive advantage in defending its sovereign territories, such as

Taiwan, and those disputed islands, such as Diaoyu/Senkaku, Paracel, and the Spratly Islands. The establishment of the East China Sea Air Defense Identification Zone (ADIZ) in 2013 prompted the PLAAF to depart from its tradition, which mainly focused on training and operations over land and coastal territory, by increasing training for maritime operations.

Since 2015, the PLAAF has increasingly conducted the high-sea training over the western Pacific and the South China Sea waters. In August and September 2016, it organized its two separate, largest combat air patrols to date that involved dozens of aircraft, including H-6K bombers, Su-30 fighters, Il-78 tankers, and Tu-154 and Y-9 ELINT planes. These aircraft took off from different airbases with one heading to Spratly Islands and Scarborough Shoal and the other flying to the western Pacific through the Miyako and Bashi Straits, respectively.⁴⁹ Allegedly, the Chinese air force used these patrols and combat exercises to learn how to organize air operations with the support of reconnaissance and early warning systems in a complex electromagnetic environment.⁵⁰ More significantly, after the pro-independent government was elected in Taiwan in May 2016, the PLAAF's bombers, fighters, and AWACS/EW aircraft have frequently flown around the island carrying out military maneuvers.

Based on unofficial records, in 2017, the PLAAF conducted at least 20 combat exercises over the Western Pacific.⁵¹ These flights often triggered Japan and Taiwan to scramble their fighters to respond. Japan declared that the Japanese Air Self Defense Force (JADF) scrambled 851 times against Chinese aircraft in 2016, but only 500 times in 2017, which represents a decline of 41 percent against Chinese military aircraft.⁵² However, in 2018, the total number of scrambles against Chinese air force and navy aircraft by the JADF was 638 times, which is an increase by almost 28 percent over the past year.⁵³ What really concerns the JADF is that the nature of China's air activities have changed considerably. More and more Chinese combat aircraft have been involved in the flights over the East China and Western Pacific, forcing the JADF to face an asymmetric competition in response. From a Chinese perspective, these routine long-range training activities of the navy and air force are efforts to improve their combat capability with the goal of expanding its reach to the Western Pacific. Nevertheless, there have been reports about tensions over these air interceptions. For example, in one 2016 incident, the Japanese fighters allegedly illuminated Chinese fighters on radar and then fired flares in response to aggressive reactions by PLAAF pilots.⁵⁴

The PLAAF's bombers, fighters, and EW aircraft flying near or around Taiwan have raised even more serious concerns. Not only have the PLAAF and PLANA steadily increased their longer-ranging and complex over-water combat training flights, but they also have apparently used these flights to familiarize their aircrews with operational procedures in a potential conflict with Taiwan. Security experts believe that such flights mark Beijing's attempt to apply pressure on the democratic elected government on the island while checking the reaction of Taiwan's defense system. The most alarming event for Taiwan, however, was the photos published by the PLAAF in December 2016 showing that the H-6K

bombers carry KD-20/KD-63 long-range cruise captive training missiles flying within visible range of Taiwan's Yushan mountain and eastern shoreline. Taiwan's defense minister reportedly believed that the mainland probably has employed these flights to establish anticipated attack routes against military facilities from the east side of the island.⁵⁵ A Chinese defense ministry spokesman advised that no countries in the region "should make a fuss about nothing or over-interpret, it will be fine once they get used to it."⁵⁶ Accidents could occur, however, and incidents have recently been reported by the Taiwan media that Taiwan's pilots had mistakenly fired flares during their missions monitoring PLAAF aircraft.⁵⁷

With transitioning from older generation aircraft to new aircraft along with significantly improved capabilities, the PLAAF is also enhancing its training by incorporating new systems and methods. It has placed emphasis increasingly on technical and tactical training in complex environments, combined arms and mixed aircraft-type training, and joint training under mission-oriented and confrontational conditions. To develop similar fighter weapons and tactics training programs to those used by the USAF, the PLAAF reorganized its test and training base at Dingxin, turning it into a modern combat training base, with a new "blue force" (brigade-sized unit) equipped with J-20s, J-10s, Su-30s, and J-16s playing the role of the "opposition force" and combat electromagnetic environment simulators. Air units from the PLAAF and PLANAF are required to go to Dingxin to participate in the annual "Red Sword" exercises conducting uninterrupted and unrestricted confrontations around the clock. These exercises are known as the equivalent of the USAF's Red Flag series, which involve various troops from the air force, such as aviation, ground-to-air missile, radar, electronic counter-measure units, designed to increase the PLAAF's systematic combat capabilities.⁵⁸

The PLAAF also established the "Golden Helmet" competition for fighter pilots in 2011 and the "Golden Dart" competition for attack aircraft pilots in 2013, using a multi-information airborne digital information recording system for recording the air combat information. Most winners of these competitions are "young" pilots who are more likely to accept the less-scripted training than older pilots who grew up with a "follow the plan" mindset. As of 2018, the PLAAF has awarded 57 Golden Helmet winners, the majority of whom are pilots of J-10B/C, J-11B, Su-30, and J-16, which prevailed in recent different types of aircraft competitions due to their technological advantages, especially electronic countermeasures. More significant is that the program has stimulated the PLAAF units to conduct their training more aggressively than ever. In early 2018, the PLAAF adopted a new flight training manual that include the techniques, tactics, and lessons learned from the Gold Helmet program.⁵⁹

Today, the PLA perceives that systems confrontation (*xitong duikang* – a contest between opposing operational systems) is the most current method of war-fighting.⁶⁰ The recent reorganization of force structure and the deployment of new weapons platforms have facilitated the PLA services to train to fight system-vs-system operations. The PLAAF regularly participates in joint multiservice exercises to improve its ability to perform critical missions such as precision strike, intelligence gathering, command and control, and air defense. Most of these joint

exercises are described as cross-military-region and “scenario-based” exercises, and thus provide opportunities for units participating in these exercises to develop rapid response and joint operations capabilities in unfamiliar environments and under complex conditions. The concepts that underpin these training events reflect an extensive understanding of the types of functions that air force units will be expected to perform with respect to systems operations in the future warfare.

No doubt, the PLA has focused closely on the U.S. military, both as a model for its own development and as a source of information on how to fight, while trying to improve its warfighting capabilities and develop its training and exercise regimen. The PLAAF has long been unrealistic in pursuing a possibility of joint air training between the Chinese J-10s and American F-16s. The U.S. laws prohibit combat training engagements with the PLA. The Chinese air force has to seek other options that could provide observations, insights, and lessons for the PLAAF to learn from foreign military services. One is the “Shaheen” series of joint air exercises between the PLAAF and Pakistan Air Force (PAF), which began in 2011 and seven such exercises have been conducted.⁶¹ Allegedly, the exercises, undertaken in a realistic environment in different air combat scenarios, have provided the PLAAF with opportunities to learn western air operation concepts and tactics through the PAF. The “Falcon Strike” exercises between the Chinese and Thai air forces are said to allow the PLAAF to test the combat tactics and weaponry of J-10 fighters in contests with Sweden-made JAS 39 Gripen fighters. The joint exercises with the Russian air force made Chinese pilots clearly aware of their inadequacies in training when witnessing how their Russian counterparts maneuvered to shorten flight paths to more quickly attack targets, achieved harder turns in bombing runs, and landed by higher angles of attack during approaches.⁶² The joint exercises with foreign air forces have helped the PLAAF to find its own training shortfalls so that it could make improvements regarding its training program.

Conclusion

For the past 20 years, China has devoted enormous energy and resources to developing a modern air force. Against all odds, such as a lack of modern air-power theory, the limited capability of China’s aerospace industry, and restricted access to foreign military technology, the PLAAF has made significant progress in modernization. This includes incorporating western offensive airpower theory into PLAAF doctrine, equipping it with a growing number of fourth- and fifth-generation aircraft and weapon systems, streamlining command and control and force structure, and intensifying training for modern warfare. More significantly, the appearance of the J-20 has already reshaped the air power landscape in the East Asian and Western Pacific regions, prompting Japan and South Korea to pursue development of their own fifth-generation stealth fighters or to purchase the US F-35s. Still, the PLAAF’s efforts to modernize itself will not cease as it focuses on integrating its advanced aircraft with effective support systems, especially space enabled information networks.

On November 11, 2018, the PLAAF unveiled a new three-step roadmap for making itself a modern air force. First, by 2020, the PLAAF will develop into a strategic service that integrates air and space power, and offensive and defensive capabilities, in which the fourth- and fifth-generation weapon systems play a major role and the systematic combat capabilities are significantly enhanced. Second, the PLAAF will improve its strategic capabilities and modernize its theory, organizational structure, personnel, and weaponry by 2035. Finally, by the mid-century, the construction of a modern and strategic air force will be completed.⁶³ This roadmap demonstrates China's ongoing efforts to build a modern air force with a focus on the development of its information systems.

Nonetheless, the PLAAF's efforts are still likely to be constrained by the technological limitations of the Chinese defense industry since it still has a relatively large number of obsolete aircraft and weaponry to be phased out. Despite the PLA's focus on the development of system-vs-system operational capability, many of the weapons platforms and operational capabilities remain to be fully developed and are even aspirational. Perhaps even more essential is that China's air and space transformation will continue to be tempered by the PLA's organizational culture, traditional military thinking, and older ways of doing things. It will take far longer for the PLA to nourish an institutional culture that genuinely embraces a new joint force philosophy. The PLAAF will be no exception to slowly change its own culture to become a strategic service with both offensive and defensive capability for future warfighting contingencies.

This review of the progress that the PLAAF made in the past decades, however, denotes that its fighting potential will continue to grow in parallel with China's economic surge and technological innovation. The PLAAF will eventually turn its aspirations into reality. Should any achievement be made by the PLAAF on the three-step development strategy, the United States and other powers will confront a genuine challenge in terms of preparing themselves to encounter increasingly capable Chinese aerospace power in the coming years. This undoubtedly is the key rationale fueling continued interest in studying the steady development of the PLAAF as it progresses through the twenty-first century.

Notes

- 1 The opinions, conclusions, and/or recommendations expressed or implied within this chapter are solely those of the author and should not be interpreted as representing the views of the Air War College, the Air University, the U.S. Air Force, the U.S. Department of Defense, or any other U.S. government agency.
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- 60 For systems confrontation and operations, see Engstrom, 2018.
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3 The United States

Rebecca Grant

Vast distances, limited forces, precious alliances: the Pacific reaching from America's West Coast and into the Indian Ocean presents the globe's number one challenge for the flexibility and agility of US airpower. "The Indo-Pacific is the Department of Defense's priority theater," declared the United States' Indo-Pacific Strategy Review of 2019. That statement "put the Pacific at the top for the first time," emphasized Air Force General Charles Brown, Commander, Pacific Air Forces.¹ Cool and careful words, but they may have undersold the strategic problem. The Pacific is a chessboard where the US is playing not one, but two opponents at once.

Both China and Russia in the 2020s will reach a maximum rate of modernization of nuclear forces and conventional forces. Russia under Putin increased its military tempo from the cyber war against Estonia in 2007 to the exotic missile tests that closed out the 2010s. China's rise was monitored as terrain features in the South China Seas were built up into military facilities, against international law. The 2017 *National Defense Strategy* notched winds of war blowing from both quarters. "China and Russia want to shape a world antithetical to U.S. values and interests," stated the December 2017 *National Defense Strategy*.²

The summer of 2019 made it apparent. The problem isn't just Russia or China. It's Russia and China combined. On July 23, 2019, two Chinese H-6 bombers passed into South Korean airspace at 0644 AM local time. Flying with them were two Russian Tu-95 bombers.

At 0840 AM the four planes were back. They flew together inside the airspace for 24 minutes. South Korean fighters fired over 300 rounds as the Chinese and Russian aircraft penetrated deeper into South Korea's air identification zone. A Russian Beriev A-50 airborne early warning radar plane pushed into the airspace several minutes later. South Korean fighters intercepted and fired 80 rounds ahead of the track of the A-50, then fired another 280 rounds when the A-50 came into the airspace again.

The Chinese continue to push the envelope a little bit at a time to see how we will respond and react. The H-6s didn't fly over water much. They fly over water pretty much every day now. They weren't flying with the Russians. Now they are,

said Air Force General Charles Brown, Commander, U.S. Air Forces, Pacific.³ Their joint bomber flight of July 23, 2019 showed that for long-range military planning purposes, the scenario of a combined fight must be taken into account.

Of course, the region is also the top priority for China, a rival with military and economic depth unlike anything the United States and allies have faced in the Pacific. “The Chinese are committed to pushing U.S. naval and air forces away from the Western Pacific (the South and East China seas,) whereas the U.S. military is determined to stay put,” wrote Robert Kaplan, who has long followed US–China military relations.⁴ Airpower as the lead element of multi-domain operations may determine who pushes whom.

In the Pacific, the chessboard is formed by the US alliances and partnerships with other nations who appreciate the rules-based international order. Trade, freedom of navigation on the sea and in the air, and now, access to space and the flow of information over cyber networks create the Indo-Pacific commons. Threats to the commons come from China’s muscular military and economic initiatives. Russia is a Pacific power with ambitions too, and a willingness to display its air and naval power in the region. Facing their combined forces in a dispute stand out as the top planning scenario for the 2020s and beyond.

American strategy rests on deterrence. “USINDOPACOM’s ability to prevail in armed conflict is the foundation of combat credible deterrence and our ability to compete,” testified Admiral Philip Davidson, Commander, USINDOPACOM, before the House Armed Services Committee in March 2019.

At the center of combat credible power in the Pacific is American airpower. While the majority of the forces are tasked from the U.S. Air Force, joint operations will include and depend on the U.S. Navy’s carrier strike groups and reconnaissance aircraft and the expeditionary combat airpower of the Marine Corps. Every lethal capability airpower can bring – including through space and cyberspace – will be needed for deterrence in this theater. American strategy hinges on the ability to swing air forces and establish, via the air, a convincing degree of control over the theater. Well into the twenty-first century, this must be done through a hailstorm of threats to information flows impacting all phases of the fight, beginning with command and control.

China and Russia promised to reach peak modernization of forces in the decade from 2020 to 2030. Against this, the US focused on staying ahead, and in some areas, on catching up, with its pace of force modernization. While the Korean peninsula remains an armed camp, it is the modernization and cooperation of China and Russia that pace the threat in the Pacific.

Fortunately for America, the Pacific is truly an airpower theater, and has been from 1941 onward. US forces have long relied on airpower to enable power projection and to concentrate combat power. This style of operations was forged by the Pacific campaigns of World War II. The drives through the Southwest Pacific led by General Douglas MacArthur and the Central Pacific led by Admiral Chester Nimitz had one overriding purpose: to secure airfields. Air controlled surface maneuver. The hasty landings on Guadalcanal could not wait a moment longer than August 7, 1942, because Japan was about to complete a

bomber airstrip on the island and lock down their control of the sea lanes toward Australia.⁵ Every significant campaign up until the landings on Okinawa in April 1945 was planned and timed to secure airpower projection, no matter what the cost, for this was the price of victory.

US airpower in the Pacific confronts similar dilemmas. Granted, the equipment and dimensions have changed. However, the fundamentals of great power deterrence in the Pacific rely still on freedom of the skies.

Containing China: emergence of the strategic problem for US airpower

In the years after the Cold War, US strategy in the Pacific rested on security cooperation punctuated with power projection.

Three incidents and a story marked out the changes. The first incident was the 1995–1996 Taiwan Straits crisis, which started when the Clinton Administration granted a visa to a Taiwanese political activist. It peaked when China conducted live ammunition exercises and missile tests in the Taiwan Strait in March 1996. Secretary of Defense William Perry ordered the aircraft carrier USS *Independence* to take up position east of Taiwan while the USS *Nimitz* made a fast transit from the Persian Gulf to the Philippine Sea. The 1996 crisis signaled that war, or at least a dust-up, was a realistic possibility.⁶ Redeploying the two aircraft carriers was a deliberate, visible act of deterrence intended to reassure allies of the US commitment while also reminding China how quickly the US could bring tremendous force into position.

Second, in April 2001, a Chinese F-8 fighter hassled then collided with a US EP-3 Aries signals intelligence aircraft on regular patrol. The Chinese pilot crashed and died. Damage to the EP-3 was so extensive that the EP-3 landed on Hainan island. China returned the crew after 11 days and US technicians chopped the plane up and flew it home in pieces.

A telling story took place sometime between 1999 and 2002. The year doesn't matter. For at that stage, China's military power was still centered in its massive People's Liberation Army and a compact nuclear deterrent force. PLA forces eyed Taiwan but did not venture far into the Pacific. Admiral Dennis Blair was in charge of U.S. Pacific Command. A visiting Chinese admiral brought up Taiwan. According to the story, Admiral Blair listened for a minute, then said: "Admiral, let me tell you a couple of things. First, I own the water out there," gesturing toward the Pacific Ocean. "And second, I own the sky over the water out there. Now, don't you think we should talk about something more constructive?"⁷

By the time Blair made those remarks, China's military thinkers were already contemplating major reform of PLA ground power. In 2003, Operation Iraqi Freedom conclusively demonstrated the dominance of airpower. "In a word, it was an air war," remarked PLA Air Force Lieutenant General Liu Yazhou. To China, Operation Iraqi Freedom also confirmed the hegemonic tendencies of the US and made clear that time was up on Soviet military doctrine. "I believe that

air power was the decisive force for the Iraqi War, though the US sent massive ground forces as well,” said Lieutenant General Liu Yazhou, of the PLA Air Force. “Air power has played a decisive role in all America’s recent wars: the first Gulf War, the Kosovo War, the war in Afghanistan, the Iraqi War.”⁸

China’s military made two major shifts in doctrine in this time period that resulted in significant investment in its air forces. China’s defense white paper of 2004 set out the new strategy of “informationalized” warfare. This was a revolution in military affairs, with Chinese characteristics, and an accent on innovation and developing an offensive mind-set. China cut its ground forces by 200,000 and laid plans to build up the navy, air force and nuclear Second Artillery forces. The air forces started acquiring new fighters, air defense, anti-missile weapons, and command and control for offensive as well as defensive operations.⁹

Building the US airpower response

B-1s and B-52s deployed to Guam in March 2003, the same month as the start of Operation Iraqi Freedom. “The ability to project force from Guam is very valuable to us,” said Pacific Air Forces Commander General William J. Begert.¹⁰

The Air Force’s Continuous Bomber Presence or CBP on Guam officially began in 2004. The CBP was formally part of US Pacific Command’s theater security packages. However, the CBP took on a high profile from the start. The bombers were on training missions, of course, but all knew they could shift into fighting mode at any time. Bomber flights simulated combat missions. Crews flew long missions like the 2007 Koa Lightning exercise in 2007. These 17–19 hour missions conducted simulated munitions drops, rehearsed electronic warfare, and integration with tankers, fighters and combat air controllers on the ground. In exercise Polar Lightning in 2009, B-2s flew 24-hour missions from Guam.

Australia’s Defence White paper of 2009 was the first major policy document to call out China’s rise. Australia also asked whether the US was firm in its commitments. The Pentagon put more planning resources toward the Pacific, but US policy was still hesitant. “The Obama administration’s pivot toward Asia signals recognition of the region’s great potential, not a clarion call for containment,” summed up Prof. Joseph S. Nye.¹¹

However, three years later, the January 2012 paper released by President Barack Obama at the Pentagon went so far as to say “we will of necessity rebalance toward the Asia-Pacific region.” “Our relationships with Asian allies and key partners are critical to the future stability and growth of the region,” the strategy added.¹²

The announcement was timely. China stepped up its activities in the South China Sea in 2012. One move was adding troops and improving a landing strip in Yongxing Island in the Paracels. China’s stated goal is to “exercise sovereignty over all land features inside the south China Sea.” Out came the charge that Vietnam, the Philippines, and Malaysia were illegally occupying many of the 40-plus small islands in the South China Sea.¹³

One airman sounded an early warning. “There are a few nations who have the ability to cause problems for us, and we’re getting to the point that our fourth-generation aircraft won’t be able to do the job we need them to do,” General Phil Breedlove said in March 2012. “We need a fifth-generation strike aircraft.”¹⁴

By 2015, the maturing Chinese force posture had redefined the central strategic problem of the Pacific: containing China. China’s defense white paper rebuked Japan and Taiwan by name, and warned of “new and severe challenges to China’s military security.” The 2015 paper also instructed China’s military forces to prepare for military struggle both in traditional and new domains and to safeguard national sovereignty and “protect the country’s maritime rights and interests,” in part by regular PLA Navy combat readiness exercises and patrols. Another nugget in the 2015 paper called for the PLA Navy to build from “off-shore waters defense” to “open seas protection” including safeguarding sea lines of communication.

Late in 2016, now-retired General Liu Yazhou put it succinctly.

China cannot be the enemy of the United States. However, the Chinese army has to take the U.S. military as an enemy. To take the U.S. military as an enemy, we must first take the U.S. military as a teacher. The U.S. military has gone too far. It is far superior to other countries in terms of war thinking, combat theory, and technical tactics, “the U.S. can defeat the world coalition.”¹⁵

In 2017, the new commander of the Chinese People’s Liberation Army Air Force urged development of a true, strategic long-range force.¹⁶ In August 2017, China activated the PLA Djibouti Support base to assist naval escort task forces. The developments led Admiral Harry Harris, Commander, U.S. Pacific Command, to testify in 2018:

Key Chinese advancements include: significant improvements in missile systems; 5th generation fighter aircraft capabilities; and increased size and capability of the Chinese navy.... I am also deeply concerned about China’s heavy investments into the next wave of military technologies, including hypersonic missiles, advanced space and cyber capabilities, and artificial intelligence – if the U.S. does not keep pace, USPACOM will struggle to compete with the People’s Liberation Army (PLA) on future battlefields. China’s ongoing military modernization is a core element of China’s stated strategy to supplant the U.S. as the security partner of choice for countries in the Indo-Pacific.¹⁷

The US was ready to respond. Enhanced funding for missile defense, space systems, hypersonics, directed energy, and other advanced technologies began in late 2016 and carried through the 2018 National Military Strategy and higher defense investment of the Trump administration’s first three defense budgets.

By this time, the militarization of the South China Seas was a *fait accompli*. Said the 2019 US Department of Defense China report:

The construction of new airfields and hangars on outposts in the South China Sea extends the possible operating areas of PLA aviation forces. Future deployed Chinese combat aircraft operating from Spratly Island outposts could extend their range and/or loiter time over the South China Sea or even reach into the Indian Ocean.

Even with those forewarnings, China's 2019 defense white paper lit up the debate like a firecracker. Front and center was China's choice to confront the United States. The paper said:

The US has adjusted its national security and defense strategies, and adopted unilateral policies. It has provoked and intensified competition among major countries, significantly increased its defense expenditure, pushed for additional capacity in nuclear, outer space, cyber and missile defense, and undermined global strategic stability.

Details in the paper spelled out serious command restructuring and laid out military modernization goals to be reached between 2020 and 2030.¹⁸

Then on July 23, 2019, Russian and Chinese bombers conducted joint drills into the airspace of South Korea and Japan. The only prudent course for US airpower was to plan to deter two opportunistic peers.

Tactical problem sets for US airpower in the 2020s

US airpower will have to deliver a flexible range of options for everything from watching the Strait of Malacca to seizing local air superiority in disputed waters to turning back China's mounting power projection forays, even if abetted by Russia.

Given the forces it's acquiring, China can now combine top equipment and information-focused doctrine into very tough tactical problems. Geography quite frankly favors China when it comes to concentration of forces. China has its entire coastal and inland territory to use as a launching point for fighters, bombers, and support and reconnaissance aircraft. Army old-timers called that "interior lines of communication." As a result, China can leverage and redeploy its smaller but carefully crafted military forces into obstacles that constrain the options of the US and its allies should a crisis arise. The Royal Air Force did this brilliantly in the Battle of Britain in 1940.

World War II battles were fought with both sides often reaching to combat locations far from home base. Japan established major logistics bases at places like Truk and Rabaul while for the Allies, Australia was indispensable, as was Pearl Harbor. The epic battles fell into distinct categories: seizing island bases;

attacking resupply lines; air superiority around contested islands (and in the Slot, naval superiority, too) or search-and-destroy missions of fleet vs. fleet. There were battles for information dominance, too and President George H. W. Bush's low-level attack on a radar station on ChiChi Jima was one of them.

The types of battles for US airpower in the Pacific in the 2020s will be similar now that adversary forces have expanded to cross-theater reach. Credible combat deterrence demands force structure matched with operational concepts. It also rests on assuring friends and foes alike that US airpower can lead the fight and deliver effective results.

By 2020, five tactical problems had emerged. The initial problem was how to continue air operations on land and at sea under a barrage of Chinese ballistic missile attacks. To this was added a second problem: the requirement to operate in the stormy conditions of denied communications, cyber intrusion, and space interference. Third was how to ensure power projection for US airpower. Linked to it was problem number four: concentrating forces to establish local air superiority to keep adversary forces from seizing territory or challenging allies. Completion by China of the South China Sea outpost bases upgraded the challenge significantly. The fifth problem emerged starkly after 2017. No longer was US airpower facing just a fight at long range. The task had evolved to include batting back at Chinese power projection with long-range bombers, enhanced naval forces, and, possibly, Russian company. The problem of containing Chinese and Russian power projection across the Pacific opened up a much wider battlespace. This was part of the reason for renaming the command to recognize the importance of all nations and of the Indian Ocean. The next section investigates the five problems.

Problem 1: Operations under missile barrages

Concerns about ballistic and cruise missile attacks on land bases and ships featured prominently in the first round of studies of growing Chinese capabilities. China's ballistic and cruise missiles launched at forward bases "will force US aircraft to operate from distant bases and will greatly reduce their sortie generation rates," wrote CSBA analyst Mark Gunzinger in an early study. "Operations in the Western Pacific region would be particularly problematic," he added, especially bases "so close to China (e.g., Kadena, Kunsan, Osan) that they are under threat of devastating air or missile strikes."¹⁹ Even the *Wall Street Journal* speculated that the DF-21D might spell the end of the aircraft carrier.²⁰

The discussion assumed Chinese missile strikes on overstuffed bases, with the US standing off and retaliating on deep, distant targets with long-range strike assets.

China built up missile capabilities to give their forces a faster route to suppressing operations by the US and allies. Until 2019, the US was limited in building up its own missile batteries due to the US–Russia bilateral Intermediate Nuclear Forces treaty.

From China's perspective, its conventional ballistic missile arsenal alone is not enough to shut down US forces operating in the Pacific. "The single-use

nature of ballistic missiles means that they have important disadvantages relative to aircraft,” found RAND analyst Roger Cliff.

China’s entire inventory of conventional ballistic missiles, for example, could deliver about a thousand tons of high explosive on their targets. The USAF’s aircraft, by comparison, could deliver several times that amount of high explosive every day for an indefinite period of time.²¹

Of course, so can China’s combat aircraft. Cliff pointed out that the combination of aircraft and missile forces is more likely to be effective than either alone. For China, perhaps much can be gained by holding those forces in reserve.

The Air Force responded with solutions to make airpower easier to redeploy and more flexible. Initiatives ranged from rapid fighter deployments to greater modularity in the air operations center.

US airpower will also engage in missile defense activities. The air commander serves as the area air defense commander. Attack operations on missile launchers are a key part of missile defense operations. The US missile defense strategy described how the F-35

can track and destroy adversary cruise missiles today, and, in the future, can be equipped with a new or modified interceptor capable of shooting down adversary ballistic missiles in their boost phase and could be surged rapidly to hotspots to strengthen U.S. active defense capabilities and attack operations.²²

Problem II: Informationalized war

China announced the intention of dominating local wars under “informationalized” conditions alongside the major reforms of 2004. Fifteen years later, control of the electromagnetic spectrum stood out as a major task of US airpower. Maritime domain awareness became an essential ingredient of fleet monitoring and sanctions enforcement.

The future Pacific fight might be eerie in its quiet. Both sides have banked on gaining advantage in the electromagnetic spectrum. Emissions will be intercepted. Even older, once-secure network links could blink like a lighthouse when they go active. “I can guarantee it will be contested and we’ll have degraded communications to deal with,” said Brown.

Domain awareness includes reconnaissance and surveillance in all its forms. To that task must be added secure communications – and an ability to cope without them. Upgrading and connecting secure communications techniques such as low probability of intercept transmissions will be an ongoing challenge for equipment, experimentation, and training.

Enabling secure battle-area networks will be a task for US airpower. Theater-wide, the communications architecture must support synchronization of operations across multiple domains. Many pick-up teams of platforms will have to

work together for rapid compilation and hand-off of a targeting track for weapons execution. The air component will also be judged to some degree on how well it facilitates the links to other domains. Naval forces and land forces will be dependent on the aerial battle networks for both offensive operations and for defensive tasks of missile defense. Agile combat employment will set additional reconnaissance and domain awareness requirements.

At the larger level, US airpower depends on command and control of major force packages. The digital force will meet major tests in the Pacific. Secure, trusted, and timely data flow will determine the effectiveness of all platforms and set the parameters to prevail over adversaries.

China, Russia, and others will be running reconnaissance and surveillance missions of their own. China's claims for its precision attack missiles hold no meaning unless China can obtain precise coordinates and act on them quickly.

China displayed increasing surveillance capabilities alongside combat forces. China's own needs plus potential international sales have driven extensive prototyping of UAVs from small drones to cargo-carrying craft. The Pentagon noted in 2019 that the "acquisition and development of longer-range UAVs is increasing China's ability to conduct long-range ISR and strike operations" and provide logistic support to forces in the South China Sea.

Commanders expect significant denial of space access. More satellites in low-earth orbit will give the Pacific theater greater redundancy. Beyond this, innovation in the handling of data will determine which side keeps the upper hand.

Problems III and IV: Ensuring US power projection and concentrating for air superiority

Planners depend on US airpower to establish air control over any battle area of the Pacific, at will. Ballistic and cruise missiles, surface-to-air missiles, and fighters and other aircraft challenge that access.

Russia developed a sea-based version of its S-300 surface-to-air missile prior to 1990. The S-300 – known in NATO as the SA-10 – is a highly capable missile. China purchased the naval variant in 2002 and deployed it on the Type 051C guided missile destroyer. Essentially, that gave the PLA Navy the ability to roam international waters with a SAM with a range reported at up to 93 miles. Reports have confirmed that China can mount its S-300 derivative on the deck of a PLA Navy ship. In December 2018, China tested the Russian-made S-400 surface-to-air missile system with its advertised 250-nm range.

The combination of missiles and air defenses give China multiple, overlapping defense extended 300nm and more from China's land and island bases.

China ran its Red Sword exercise in 2018 with a large, integrated force opposing an intervening third party in a base-versus-base shoot-out.²³ Forces of that type can impede US power projection and make it difficult and costly to achieve working air superiority for the joint force. The scenario of a true battle for air superiority over China's "near seas" could play out with numerous air-to-air engagements between the US with allies, and China.

From the beginning, some percentage of US fighters will be needed to protect “rear area” aircraft forming the lifeline of power projection. Protecting support aircraft over the battlefield has been standard for some time – especially in the dense Korean scenario – but it’s a far cry from recent experience such as Libya where air-to-air defense was only needed in small quantities and for a few days. US success in these missions (and a cornerstone of regional deterrence) will rely on qualitative superiority plus a sufficient number of attacking aircraft.

Then the encounter could go one of two ways. First, China has the option to set up asymmetric air battles defending major targets, much as the North Vietnamese did long ago. US strategy calls for punching through air defenses to attack and hold at risk targets on the mainland.

Consider how those moves might play out. Assume the first set of major targets will be airfields and missile sites. US forces will have to attack in sufficient numbers to get through both Chinese fighters and air defenses. Mission packages will launch from island bases and aircraft carriers. The strike aircraft will then cross open ocean and refuel before heading to their targets. However, China’s PLAAF will have time to detect the direction of the attack and divert fighters to intercept. Mission packages will fight through the PLAAF interceptors then egress into targets covered by overlapping air defenses. The battle will concentrate along major air corridors. In this case, there is no option for crossing Chinese airspace from multiple directions – a key feature of how bombers planned to tackle the Soviet Union’s airspace during the Cold War.

Fighters can bring many assets to the battle. Decoys such as the Miniature Air Launched Decoy (MALD) can mimic the electronic presence of a strike aircraft on enemy radar sensors. In this environment, survivability is a matter of numbers: how many surface-to-air missiles or fighters line up valid shots? Losses are to be expected. Stealth, speed, and altitude will help offset them. US fighters may be able to deploy laser weapons after the mid-2020s to assist with exchange ratios.

However, the map always favors the combatant working on the shortest interior lines, in this case, China. In this scenario, the PLAAF and PLA Navy air forces will be in position to be highly selective about where and when it engages. PLAAF fighters will be able to attack incoming US aircraft at several places en route and to harass them again after they complete their missions and turn for home. US forces will have to mass for protection and to put enough aircraft in the air to ensure that most can complete the mission. Against this, China can vector dozens of fighters for the intercept.

U.S. Navy carrier strike groups will feature prominently. Assume that in a crisis, China positions guided missile destroyers with air defenses near contested islands and activates electronic countermeasures and air defenses on those islands in an attempt to deny access to international forces. Facing down this claim could fall to carrier air. F-35Cs on the deck would be essential. The Chinese frigates could attempt to establish lock-out of US and international aircraft by placing the guided missile frigates in a formation that extends to 200 miles, for example. To regain access, US forces might seek out and destroy the

guided missile frigates. Carrier deck fighters must penetrate much further against the SAM-carrying frigate and get close enough to launch a lethal strike.

Add in China's aircraft carriers and the situation grows even more complex. With Chinese carriers present, the US carrier air is needed to hold the frigates at risk while also pushing the air battle out away from the US carriers. Recall the air defenses in place with China's fleet. Legacy fighters might participate as final close-in defense, but it is the F-35 that delivers hefty advantages in this high-stakes scenario. No doubt US ships, submarines, and land-based aircraft will be going after the Chinese guided missile frigates, too. US forces need to be effective in executing this concept in order to maintain deterrence in the South China Sea and elsewhere.

The air tasking will include combat air patrols, too. Distances are such that the US will not likely be able to maintain blanket air superiority. Instead, the air missions will be of the hunt and destroy variety. For example, if China launches unmanned planes to hunt and track the carrier, what will the response be? One very likely possibility is to launch manned, US fighters to drive them off. Running high-altitude defense missions will add to the burden of tasking for the carrier air wings and any land-based fighters that can help out.

The battles for air superiority in the Pacific could be intense and costly. Americans have not seen large-scale air battles in over 40 years. The tactical parallels trace back to the Vietnam War, and also to the long air superiority campaigns of World War II.

The middle years of the Vietnam war provide an especially good analogy that illustrates why China's air force is now potent enough to pose real problems. From 1962 to 1967, the North Vietnamese total combat aircraft inventory never exceeded 97 fighters and the number of advanced MiG-21 Fishbed fighters with infrared missiles peaked at 16 in 1966. Eminent historian Walter Boyne summarized the tactics used by this small force:

Operating under ground control, and making maximum use of both cloud cover and the almost benevolent American rules of engagement, the enemy aircraft were adroitly employed. The MiGs, especially the later model MiG-21s armed with heat-seeking missiles, sought to attack the strike flights and make them jettison their bomb loads prior to reaching the target areas.

The North Vietnamese ground controllers considered the fighter missions to be fulfilled if the bomb-carrying F-105s jettisoned bombs before the target but "they tried to score kills wherever possible," noted Boyne.²⁴ Air defenses claimed many. In fighters alone, the U.S. Air Force alone lost 382 F-4s, 198 F-100s, and 334 F-105s for a total of 914 fighters out of 1,737 total combat losses from February 1962 through October 31, 1973.²⁵

If there is one key variable, it could be how well US fighters do in holding off Chinese fighters and clearing the area to carry out strikes. Consider the consequences of failure. If Chinese fighters disrupt combat air patrols or maul strike

packages, what is the next move for the US and its allies? The choices would be to back off or to return the next time with greater force. The probability of success diminishes with losses. The control of escalation – always cherished in a crisis – could become difficult, too.

Problem 5: Detering and defeating China's long-range power projection

The previous scenarios postured China and Russia on the defensive or in local operations. But both have attained the reach and force structure to take the offensive and range the Indo-Pacific. Whether via limited raids or sustained operations, the prospect of offensive action by adversaries radically shifted the problem set for US airpower.

"I do see the potential for them to start working together," acknowledged Brown of US Air Force, Pacific (PACAF).²⁶ China has the option of combining its most advanced H-6 bomber variants with air-launched land attack cruise missiles. Guam and all other theater bases would fall in range of the H-6 bomber given those specifications.²⁷

China's H-6 bomber is an old design derived from the Soviet Union's Tupolev 16 Badger bomber. The total build was about 150 H-6 bombers shared among the PLAAF and PLA Navy. Up to five were converted to air refueling capability in the mid-1990s.

By itself, the 1950s-era technology is not impressive. However, at least one variant, the H-6K, reportedly can deliver six DH-10 cruise missiles or carry 6–8 long-range air-to-air missiles primed for hunting airborne early warning aircraft such as the E-3 AWACS and E-2C/D Hawkeye.²⁸ Chinese media in 2016 claimed the H-6K might also be a nuclear-capable bomber. It's likely that no more than a few dozen are modified to the H-6K and H-6M variants. The catch is that China probably needs no more than a handful to present US forces and allies with a major air intercept challenge.

China will also add a stealthy bomber in the mid-to-late 2020s. Russia repeatedly claims to be working on a stealth bomber, and is already testing and deploying hypersonic missiles for its advanced fighters.

The growing bomber capability means China, Russia, or the combination can create havoc in the air over the Pacific and to do so simultaneously at widely separated points.

Chinese bombers launched from coastal bases could head in multiple directions. Whether they carry anti-ship or land-attack missiles might not be known. Once the bombers crossed a certain point, the primary desired response would be air intercept. At a low level of strategic tensions, the intercepts would unfold in ways similar to the regular Russian and US encounters in the airspace of Alaska and Canada. Russian Bear bombers and US F-22s routinely meet, take snapshots of each other through from the cockpit, and return home to debrief. Encounters with Chinese H-6s would be stressful but could become routine.

The choices would be much more difficult during a period of tensions if the H-6Ks were armed on their under-wing pylons. First to be potentially vulnerable would be US Navy ships operating near China. However, it's easy to picture a scenario where US fighters from Korea, Japan, Guam, or allied bases get the call to run intercepts as well. The truly devilish prospect would be combining feints against both sea- and land-based forces at the same time. As Chinese military confidence grows, possibilities expand.

Strengthening the force

These scenarios are only sketches of possible outcomes, but they are a sobering guide to what the US should prepare to face – and to deter. US airpower tacticians will have their work cut out for them. US airpower will engage in constant modernization in force structure and concepts to maintain credible deterrence in the Pacific. Credible deterrence will depend on extra efforts to keep modernization of aircraft, weapons, sensors, and command and control on track.

None of these challenges can be met without sufficient aerial refueling. Tankers, as ever, hold the key. Reaching and maneuvering around the Pacific in full-up combat will place maximum demand on tankers and the U.S. Air Force must be ready to supply them.

The scenarios also pointed out that long-range aircraft and weapons of all types will pay dividends in the Pacific. Long-range reconnaissance, the global reach of bombers, and weapons like the Long-Range Anti-Ship Missile (LRASM) will allow US airpower greater control of deterrence and engagement. The unique long-range bomber capabilities will be greatly improved as the B-21 Raider becomes operational in the late 2020s.

One of the most urgent tasks for strengthening airpower in the Pacific will be to complete the delayed modernization of the US fighter force and transition from the fourth-generation designs to a full, robust fifth-generation fleet.

The U.S. Air Force, Navy, and Marine Corps set out on a modernization path in the 2010s intended to revamp their fighter forces with F-35s, but did not make the rapid progress once planned. Delayed F-35 buys and extra wear and tear in the anti-ISIS fight left the force with deficits to make up. However, the primary response tool for a range of anti-access strategies will be US fifth-generation stealth fighters: namely, the F-22 and F-35. Their stealth and sensor fusion will make them the essential framework for command and control as well as strike and air superiority. B-2s and B-21s will also have advanced sensor fusion capabilities.

Fighters make the difference in gaining air superiority. But they also provide a full range of options from combat air patrols to limited strikes. These options are likely to be high on the list for US policy makers making choices in the Pacific. Beyond this, the majority of F-35s in the Pacific in the late 2020s will belong to allies.

At the tactical level, the initiative of airmen is irreplaceable. US training provides all the ingredients for decentralized execution. However, airmen in the

Pacific of the 2020s will rely on portable, secure communications that continually push streamlined data through resilient battle networks. The information flow will have a constant momentum of its own, available for operators to connect for brief spurts yet receive updated, processed information on threats and plans.

US airpower in the Pacific seeks to deter, above all. But that entails capabilities crafted to make the operational problems harder for China, Russia, or any others who might launch military operations. Doubt is a strategic capability. Key bases and operating areas that present as tough targets shape diplomacy even before crisis response.

At the line between tactics and operations, the short-term goal is to prevent China from maturing its own power projection abilities. Just as the intermediate goal of AWPD-1 was to gain air superiority over the Luftwaffe, containing the operational reach of China may determine future strategic options.

US airpower in the Pacific will also play a special role in upholding the rules-based international order. One of the greatest strengths in the region is the bond among airmen. The aircrews that fly together in exercises in the Indo-Pacific build bonds based on technology and experience and all the things airmen have in common regardless of where they come from. Of China, Brown said “They don’t have airmen like we have. They don’t have partners like we have.”

It will also fall to the air component to defend against air and missile attack. Area air defense depends on situation awareness, attack operations, and interception. The Pacific of the 2020s will mix the best of layered theater and point defenses with evolving technology concepts. Brown spoke of projected uses for directed energy and hypersonic weapons in the area air and missile defense mission set. “If I could take directed energy to cover 200–300 nm, I could put a bubble around several islands and be able to operate with a level of confidence,” Brown said. “It’s a different mindset from how we do things today.”²⁹

A note on how doctrine affects airpower in multi-domain operations

Joint operations could face their most severe test ever in the Pacific. To pass the test on day one, all components must understand the predominant role of airpower.

US airpower in the Pacific will rely on initiative, risk, and judgment of airmen at dispersed locations and imperfect command and control. “I’d rather have airmen out taking action than waiting to be struck,” Brown said.

Often as concepts change, the strong working relationships between the air and land component lag behind. Each component understandably addresses the challenges of the Pacific from within its own frame of reference. It takes time, and usually a battle, to uncover misunderstandings and prompt the three- and four-stars to improve command and control.

Such was the case with the last hours of Operation Desert Storm. Rapid retreat by Iraqi forces and the accelerated drive of Army forces caused Army headquarters to move a fire support coordination line far in advance of the forward line of troops. The repositioning curtailed airstrikes in the area. Elite Iraqi armored forces escaped. Similar problems recurred in 2002 during Operation Anaconda, where the Army air-assaulted forces into a remote area of Afghanistan without allowing proper time for coordination with the air component for ISR, interdiction, and close air support, decisions that earned an official reprimand from Chairman of the Joint Chiefs of Staff General Richard Myers.

The operational doctrine problems may sound academic but they aren't. In a Pacific conflict, a few hours of poor coordination over attack of adversary long-range fires could close air bases, cost lives, and jeopardize victory.

The new concepts are also raising classic doctrinal problems. In 2018, the Army tested a Multi-Domain Task Force built around a rocket and missile artillery brigade. With the mobile task force, the Army employs missile defense and delivers long-range fires on land targets or naval targets. The task force also joins the electronic warfare and cyber efforts to crack enemy defenses and target adversary long-range systems. Building this Army concept helps with the immense problems of the Pacific but it also raises problems in overlap of command and control, airspace, and targeting.

It will fall to airmen as they move up in rank to generate understanding with senior leaders from other services about the efficient application of airpower. Chinese force modernization and Russian tactics can't be controlled. Education of commanders can be. The Pacific, as ever, will tolerate no errors.

For as China wrote in 2019: "The world is not yet a tranquil place."³⁰

Notes

- 1 Brown, 2019.
- 2 United States Department of Defense, 2017, p. 25.
- 3 Brown, 2019.
- 4 Kaplan, 2019.
- 5 Morrison, 1963.
- 6 Ross, 2000.
- 7 "Admiral takes new tack with intel position," 2009.
- 8 Chan, 2005.
- 9 *China Defence White Paper 2004*.
- 10 Grant, 2013.
- 11 Nye, 2011.
- 12 United States Department of Defense, 2012, p. 2.
- 13 Perlez, 2012.
- 14 Dorfner, 2012.
- 15 Liu, 2016.
- 16 United States Department of Defense, 2019a, pp. 40–41.
- 17 Harris, 2018.
- 18 State Council Information Office of the People's Republic of China, 2019.
- 19 Gunzinger, 2010, p. 18.
- 20 Barnes, 2012.

- 21 Cliff, 2010.
- 22 United States Department of Defense, 2019b, p. 55.
- 23 United States Department of Defense, 2019a, p. 23.
- 24 Boyne, 1998.
- 25 Correll, 2004, p. 25. The USAF and USN combined had 5 aces in Vietnam. North Vietnam had 16. See p. 35.
- 26 Brown, 2019.
- 27 United States Department of Defense, 2019a, p. 41.
- 28 China Threat Blogspot, 2009.
- 29 Russell, 2019.
- 30 *China Defence White Paper 2004*.

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4 The European powers¹

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The Indo-Pacific region is vast, with the distance from Mombasa, Kenya to San Francisco over 12,000 nautical miles. Spanning 19 time zones, and connecting six of the globe's seven continents, the Indian and Pacific Oceans border on the world's most populous nations and connect five of its largest economies. More than half the world's goods and merchandise move over the sea lanes connecting the Middle East, East Asia, and the Americas. Of the continents, only Europe has no shoreline on the Indian or the Pacific Oceans, but both France and Britain have overseas departments or territories in the region. Given the Indo-Pacific region's importance as a hub of trade and the focal point of intensifying great power rivalries, Europe as a whole – and Great Britain and France in particular – recognize that they have economic and geopolitical interests at stake in the region. Britain's withdrawal from East of Suez in 1971 signaled the end of European great power aspirations in the Indo-Pacific, but globalized production, trade and investments, and a concern over the rules-based international order have generated a renewed commitment to engage with others in the region.²

Europe is home to major aerospace industries such as Airbus SE, BAE Systems, Dassault Aviation, Finmeccanica S.p.A., Rolls-Royce plc, Saab, and Thales, selling both civilian and military aircraft, equipment, and maintenance/modernization packages to the countries of the Indo-Pacific region. The Indo-Pacific region figures prominently in European and national economic strategies; European military aerospace exports to the region have increased dramatically over the last 15 years. The Indo-Pacific region has surpassed the Middle East as the largest importer of major weapon systems, accounting for 42 percent of the global trade. France, Germany, the UK, Spain, Italy, and the Netherlands rank among the top ten exporters of weapon systems.³

Europe's role in the Indo-Pacific aerospace domain extends beyond commercial and military sales to the region. Great Britain and France continue to count among the very few countries in the world that field full spectrum conventional air forces as well as deterrent nuclear arsenals and delivery platforms. Though their military airpower is continentally focused, the UK and France can surge assets into the Middle East and Indo-Pacific region on a limited basis. The UK and France have signed basing agreements with various Gulf nations, they have sovereign territories with facilities in the Indian and Pacific oceans, and both are

intensifying existing multilateral security agreements while cultivating new defense relationships.

The British government contends that the United Kingdom, with the world's sixth largest economy and relationships around the world, is a global actor and Europe's largest national security contributor.⁴ Over the last decade, it has exceeded NATO's threshold of devoting at least 2 percent of budget expenditures to defense matters.⁵ The government projects that by 2025, the Royal Air Force will have two operational F-35 squadrons, seven Typhoon squadrons, 14 Voyager airborne tankers, nine P8 maritime patrol aircraft, a robust airlift capability consisting of 22 A400M and 14 C130J aircraft, over 20 armed MQ-9B Protector remotely piloted aircraft, and six Force Protection Wings. In addition, the Ministry of Defence envisions creating a maritime task group centered around one of the new *Queen Elizabeth* aircraft carriers and supported by new logistics ships and tankers.⁶ The British government simultaneously is embarking on a 20 year acquisition program to replace its four *Vanguard* class nuclear ballistic submarines with four new *Dreadnought* submarines, with the costs of the program estimated at £31 billion over its lifetime. Whether Britain can sustain these acquisition and modernizations programs in light of the projected slow-down of its economy is unknown at this time. Brexit will affect both Britain's military budget and its dedication to the concept of a "Global Britain" geopolitically engaged in the Indo-Pacific region. The protracted uncertainty associated with Brexit has already affected the British economy. The long-term impact of the decision remains to be seen. Nonetheless, as of 2019 British ambitions in the Indo-Pacific run high, with government spokespersons and analysts confidently asserting that Britain is returning "East of Suez."⁷

France likewise devotes considerable resources to its air force, and given its territories in the Indian and Pacific oceans, is committed to playing a geopolitical role in the Indo-Pacific region. The multi-year defense budget signed into law in 2018 projects yearly increases in military spending until France reaches NATO's 2 percent defense spending target in 2025.⁸ In July 2018, the French Air Force had 102 multi-role Rafale combat aircraft, 134 Mirage attack and fighter jets, 78 transport aircraft, 14 tankers, 75 helicopters, and six unmanned aerial vehicles in service.⁹ The multi-year defense budget anticipates upgrading 55 of the Mirage 2000s, retiring others as the Rafale fleet expands by 28, purchasing additional tankers, and increasing France's inventory of MQ-9 Reaper remotely piloted aircraft. France's *Force de dissuasion* (nuclear deterrence) has been modernized over the past decade: in 2010, the French navy commissioned its fourth *Triomphant* class ballistic submarine, allowing it to always have at least one SSBN deployed to ensure sea-based deterrence into the 2030s. France's Strategic Air Command likewise recently completed a modernization program, retiring the venerable Mirage 2000 nuclear bomber in 2018 as it transitioned to the Rafale B to maintain France's airborne nuclear deterrent force. The *Charles de Gaulle* aircraft carrier, in service since 2001, completed an 18-month midlife refit in September 2018. The upgrade extended the ship's life by 15 years.¹⁰ France's Minister of Defense initiated an 18-month study in October 2018 to

analyze future requirements for a replacement to France's sole carrier. The study will examine the size requirements, propulsion options, and aircraft types needed for a future replacement.¹¹ France is intent on remaining a global power capable of defending its interests, territories, and claims in the Indo-Pacific region.

While Britain and France stand out in terms of their full spectrum air forces and nuclear deterrents, a number of other European nations field top notch combat aircraft or have significant ISR (intelligence, surveillance and reconnaissance), maritime patrol, or command and control aircraft. Germany, Italy, the Scandinavian nations, Belgium, the Netherlands, Spain, and Poland have capable air forces and/or significant aerospace companies. These nations have contributed to various NATO, EU, and coalition air missions in Afghanistan, Syria, and Africa over the course of the last decades. Few of these middling powers, however, have geopolitical ambitions in the Indo-Pacific, with their interests largely focused on commercial sales, aviation safety, and humanitarian assistance to the region. As NATO shifts its focus from out-of-area operations back to the defense of Europe, it seems most likely that European powers other than France and the United Kingdom will only project military airpower into the Indo-Pacific as part of a European Union operation or United Nations mandate. An overview of European, British, and French strategies, plans, and objectives regarding the Indo-Pacific region serves to set the stage before assessing European airpower, interests, and positioning in the region.

Strategies, plans, and objectives

In 2016 High Representative Federica Mogherini issued a vision and action plan for a stronger Europe entitled *A Global Strategy for the European Union's Foreign and Security Policy*. The document enunciates European shared interests and principles, ranging from the security of EU citizens and territory to the prosperity of its people to a commitment to promoting a rules-based global order. While prioritizing the security of the union and the resilience of Europe's neighbors to the East and South, the 2016 strategy statement included commitments to deepen trade and investment with China and work toward free trade agreements with Japan, India, and the ASEAN states.¹² Following publication of the EU's 2016 *Global Strategy*, the High Representative and the European Commission issued the joint paper *Connecting Europe and Asia* (September 2018), as well as strategy papers regarding the European Union's relationship with India (November 2018) and China (March 2019).¹³

Recent policy statements have adopted a stern tone towards China. In *Connecting Europe and Asia – Building Blocks for an EU Strategy* (2018), the High Representative and the European Commission noted that the "EU is committed to the freedom of navigation" and that it will "stand firm on the respect for international law ... and its arbitration procedures."¹⁴ This implicit critique of China and its policies in the South China Sea became more explicit in the joint European Commission/High Representative assessment of EU–China relations

issued in March 2019. The assessment warns that Chinese maritime claims in the South China Sea, and China's refusal to accept binding arbitration rulings, affect the international order and make it "harder to resolve tensions affecting sea-lanes of communication vital to the EU's economic interests." The study concludes that China's increasing military capabilities and ambitions present a security issue for the EU and "must be addressed in the context of our mutual relationship."¹⁵

Britain's strategic posture in the Indo-Pacific region is laid out in its 2015 *National Security Strategy and Strategic Defence and Security Review* (NSS-SDSR 2015), the follow-up 2018 *National Security Capability Review* (NSCR 2018), and in various statements by the Prime Minister, Foreign Secretary, and Defence Secretary on the concept of Global Britain. The *National Security Strategy* sets out three broad objectives for British foreign and security policy: protect Britain's people, project Britain's global influence, and promote British prosperity.¹⁶ The *SDSR* elaborates that Britain will "strengthen the rules-based international order," "champion an open and rules-based international trading environment," "maximise prosperity opportunities from our defence, security, diplomatic and development activities," and "support the UK's defence, resilience and security industries to grow, including through exports and through investment in skills."¹⁷ The document envisions a multi-dimensional approach to achieving Britain's objectives, noting how British industry and services, its armed forces, its security and intelligence agencies, its diplomatic service, and other levers all contribute to building a secure, stable, and prosperous future. In the Persian Gulf, it pledges to maintain a "permanent and more substantial UK military presence to reflect our historic relationships, the long-term nature of both challenges and opportunities and to reassure our Gulf allies."¹⁸ In East Asia, it promises to build a deeper partnership with China, pursue a free trade agreement with India, and work with like-minded partners in the region such as Japan, Australia, New Zealand, and others. More specifically, the *SDSR* identifies the Five Power Defence Arrangements between the UK, Australia, New Zealand, Malaysia, and Singapore as important to peace and security in the region, pledging to increase Britain's contribution to the group through additional joint training and greater British participation in future exercises.

The 2018 *National Security Capability Review* confirmed the overall objectives of the 2015 *National Security Strategy*. It formalized the multi-dimensional use of British power, dubbing the approach the "Fusion Doctrine." The British government aims to involve a wide range of government departments and partner with the private sector to deploy security, economic, and influence capabilities to achieve its objectives. Britain's military power will be used in concert with the other dimensions of power to respond to the changing strategic context. The review deemed that the strategic context had deteriorated since 2015, with terrorism, extremism, and instability posing an increasing threat while state-based threats are eroding the rules-based international system. The Asia-Pacific region is viewed likely to become more important for the UK in the years ahead, with the risk of miscalculation and conflict in the region

increasing. British airpower will contribute to the “fused” use of British power and influence in the region. The review projects that HMS *Queen Elizabeth* will make its first deployment in 2021, with HMS *Prince of Wales* commencing sea trials by the end of 2019. The British government plans to have a carrier strike force of two operational squadrons of F-35 Lightning aircraft ready and in-service by 2023. In order to coordinate British efforts in the Indo-Pacific, it has established defense staffs in Dubai and Singapore.

In addition to these formal strategy reviews and policy statements, the prime minister and her secretaries for foreign affairs and defense have given numerous speeches on the topic of Global Britain. Following the 2016 Brexit referendum, Theresa May told Conservative party members that Brexit should “make us think of Global Britain, a country with the self-confidence and the freedom to look beyond the continent of Europe and to the economic and diplomatic opportunities of the wider world.”¹⁹ Boris Johnson, then Foreign Secretary, reinforced this point, reassuring the public that Britain was a world power “running a truly global foreign policy.”²⁰ Speaking to the Conservative Party Congress in 2017, he waxed eloquent, claiming that “We are big enough to do amazing things. We have the ability to project force 7,000 miles ...”²¹ These speeches have been amplified by presentations, think tank reports, and security policy articles confidently asserting that Britain has returned East of Suez.²² At the June 2019 Shangri-La Dialogue in Singapore, UK Defence Secretary Penny Mordaunt confirmed that Britain’s new flagship, HMS *Queen Elizabeth*, will sail into the region in one of its first operational deployments in the early 2020s.²³

French strategy and policy toward the Indo-Pacific region was laid out in the 2013 French *White Paper on Defence and National Security*, which was updated following the French presidential elections of 2017 by a *Strategic Review of Defence and National Security*. In 2018, the French Ministry of Defence (MoD) and the Ministry of Foreign Affairs published a study focused on French defense and security policies in the Asia-Pacific theater. Updated in 2019, the document provides a clear-cut statement of French interests, policies, and strategies specific to the region. It explains to the public why France should be concerned about the Indo-Pacific. First and foremost, French citizens should care because 60 percent of the world’s population lives there and one-third of global trade is conducted in or with the region. The MoD and Ministry of Foreign Affairs agree that stability in the area is crucial, with any crisis or conflict “likely to affect adversely the interests of France as well as Europe’s.”²⁴ Laying out these interests in numbers, the paper reminds its readers that 465,422 km² of French territory are located in or adjacent to the Indian and Pacific Oceans; that 1.6 million French citizens live in French overseas departments and territories in the region; and that over 200,000 French nationals reside in other Indo-Pacific countries.²⁵

The French MoD and Ministry of Foreign Affairs believe that the region’s major security challenges are those identified more generally in the 2013 *White Paper* and the 2017 *French Strategic Review*: terrorism, the return of power rivalries, the weakening of the rule of law, and new unconventional threats. North Korea’s ballistic and nuclear programs are singled out, as are “large-scale

land reclamation activities and the militarisation of contested archipelagos” in the South China Seas.²⁶ In addition, France believes that the defeat of Daesh’s caliphate in Syria and Iraq will generate problems, as foreign fighters return to their homes in South Asia and Southeast Asia and elevate the risk posed by terrorism. Faced with these realities, France is committed to invigorating partnerships, increasing its participation in exercises, and strengthening its enduring presence in the region.

European airpower and commercial interests in the Indo-Pacific region

European Union, British, and French strategy and policy papers relating to the Indo-Pacific region all emphasize its importance as an export market that generates jobs, industry, and wealth for Europe. European firms compete vigorously for shares of the Indo-Pacific civil and military aerospace market, supported by national representatives, through trade organizations, and by European Union officials. The EU Commission’s *Flightpath 2050* estimated that European aeronautical firms generated over 60 billion euros of exports in 2009, with 82,000 companies and 500,000 jobs linked to the aeronautical sector.²⁷ Boeing’s recent troubles, coupled with mounting US–Chinese trade tensions, are creating opportunities that European companies and governments are eagerly exploiting to increase their already substantial role in the Indo-Pacific aerospace market.

Britain explicitly links its geopolitical role in the Indo-Pacific region to economic considerations, exports, and job creation. Britain is the world’s sixth largest exporter of armaments, with the aerospace sector accounting for 87 percent of these exports over the last decade.²⁸ The Ministry of Defence’s 2018 *Combat Air Strategy* notes that the UK’s military aerospace sector has an annual turnover of over £6 billion, directly supports over 18,000 skilled jobs, creates another 28,000 jobs in the supply chain, and involves over 2,000 companies.²⁹ The *Combat Air Strategy* connects capability with investments in research and development, laying out a framework that envisions capitalizing on Britain’s world-class aerospace sector in order to create jobs, partner with other nations in joint projects, and support the vision of a Global Britain.³⁰

If one includes Saudi Arabia and the UAE as part of the Indo-Pacific region, the area accounted for almost 40 percent of the global share of weapon imports between 2013 and 2017, with the region’s importance as a military market accelerating.³¹ Britain’s role as an exporter of military equipment to the Gulf, and the connection between these exports and British jobs, is not a new development. The Anglo-Saudi Al-Yamamah I and II contracts were enormously profitable to British Aerospace and its successor BAE Systems. The deal is estimated to have been worth over £40 billion over the 30-year period it lasted (September 1985–August 2006), with a successor deal (the Al Salam arms deal) signed in 2014 and estimated to be worth another £4.4 billion. The Al Yamamah deals equipped the Saudis with 120 Tornado aircraft along with armaments, and the Al Salam contract will upgrade the Saudi inventory with 72 Typhoon fighters.³²

Both deals were quite controversial in Britain, with charges of corruption, backroom dealing, and supporting a regime that paid little attention to human rights.³³ Nonetheless, the contracts proved enormously lucrative, and the British government has been keen to exploit sale opportunities to partner nations and friendly regimes in the Gulf and Indo-Pacific region, in particular Gulf Cooperation Council states, Commonwealth countries, members of the Five Power Defence Arrangement, South Korea, and Japan.³⁴

French exports to the Indo-Pacific region – not including armaments – were worth more than 66 billion euros in 2018, and constituted 14 percent of French global exports and 34 percent of its exports outside the European Union.³⁵ Focusing on military sales, between 2008 and 2017, France sold over 20 billion euros of military equipment to the region, with the largest defense customers (in descending order) being India, Singapore, Malaysia, South Korea, Indonesia, and Australia.³⁶ French armament sales to India alone were worth over 13 billion euros.³⁷ France, like Britain, recognizes that its full-spectrum air force and strategic autonomy depend on sustaining a solid defense industry and technology base (“une base industrielle et technologique de défense” or BITD). French aerospace firms such as Dassault Aviation rely on military exports, with sale orders to India and Qatar exceeding those placed by the French Air Force itself in 2016.³⁸ As a whole, more than 4,000 small and medium-sized enterprises comprise France’s BITD, creating more than 200,000 jobs in France.³⁹

British and French firms such as BAE Systems, Rolls-Royce plc, Dassault Aviation, and Thales lead the way in European military aerospace sales to the Indo-Pacific region, but by no means are the only European conglomerates involved selling civil and military aircraft, equipment, and expertise to the region. Airbus SE, formerly the European Aeronautic Defence and Space Company (EADS), is heavily engaged in the Indo-Pacific aerospace market, both commercially and in the field of military aviation. In addition, Finmeccanica S.p.A. (Italy) and Saab AB (Sweden) sell both civilian and military aircraft and equipment to the region.

The EU, European governments, and European aerospace firms all recognize that the Indo-Pacific region, and Asia in particular, is enormously important to European jobs, prosperity, and growth. They acknowledge this in their strategies, position papers, and vision statements. Yet Europe’s interests are not confined to the economic and commercial sphere. The United Kingdom and France, in particular, have staked out geopolitical goals and are using airpower as one of the levers to address these.

Geopolitical interests, bases, and partnerships

British and French strategic reviews show very similar assessments of the risks that challenge their interests globally and in the Indo-Pacific region. Britain’s 2018 *National Security Capabilities Review* identifies six major challenges likely to shape the UK’s strategic priorities in the coming decades: 1. the increasing threat posed by terrorism, extremism, and instability; 2. the resurgence of state-based

threats and intensifying state competition; 3. the erosion of the rules-based international order; 4. the impact of technology, especially cyber threats and wider technological developments; 5. the ongoing growth in serious and organized crime, and 6. diseases and natural hazards affecting the UK.⁴⁰ France's 2017 *Strategic Review* and its 2019 study *France and Security in the Indo-Pacific* identifies a similar set of risks and challenges to French interests in the region: 1. terrorism, which was changing shape and spreading to new areas; 2. the worrying return of rivalry and power assertiveness; 3. the weakening of the rule of law and multilateralism, and 4. unconventional challenges, with climate change identified as a threat multiplier that directly concerns the Indo-Pacific region.⁴¹ While a number of these threats are best addressed using instruments other than airpower, Britain and France are leveraging airpower as part of their strategies in the region.

Gulf, Horn of Africa, and Arabian Sea

In the Persian Gulf, Red Sea, Horn of Africa, and Arabian Sea, Britain and France have committed to maintaining an enduring military and air presence. For the last two decades, the RAF has been heavily involved in US-led, coalition campaigns in Afghanistan (British codename Operation Herrick, 2002–2014), Iraq (British codename Operation Telic, 2003–2011), and against Daesh/ISIL in Iraq and Syria (British codename Operation Shader, 2014–), and commitments related to training and assistance continue after the declared end of military operations. At peak effort, the RAF operated hundreds of military aircraft from airfields ranging from Kuwait (Al Salem, Al Jaber), Qatar, (Al Udeid), the United Arab Emirates (Al Minhad), and Saudi Arabia (Prince Sultan Air Base) to Afghanistan (Kandahar), Cyprus (RAF Akrotiri), and the UK. These operations reflected British concerns about terrorism and radical extremism (Afghanistan, Iraq/Syria 2014–) and state-based threats to the international order (Iraq). Yet unlike the early 1970s, the UK decided against withdrawing from the Gulf region once operations in Afghanistan and Iraq terminated. British governments have explained the necessity for an enduring British presence in the area in terms of deepening partnerships, contributing to stability, and fostering relationships rather than singling out specific groups (al Qaeda, Daesh/ISIL), states (Iran), or non-state actors (Somali pirates, smugglers, etc.).

In 2012, Chief of Defence Staff General Sir David Richards laid out plans to deploy significant British military assets to the Middle East, in particular to the six Gulf Cooperation Council states. He noted that Britain was reorganizing its forces into a new Joint Expeditionary Force which would be capable of “projecting power with global effect and influence,” and indicated that the UK anticipated rotating expeditionary forces through the Gulf region in order to reassure Britain's friends and deter their adversaries.⁴² Richards elaborated that Britain envisioned prepositioning forces and equipment in the region, asserting that: “After Afghanistan, the Gulf will become our main military effort.”⁴³

As part of this vision, the UK is expanding the naval facilities at Mina Salman in Bahrain and has stationed four mine-hunter vessels there as part of its long-standing maritime presence in the area (Operation Kipion). The new port facility, HMS Jufair, will be able to host the Royal Navy's Type 45 destroyers but is too shallow to berth *Queen Elizabeth* class carriers pier-side. Britain's 2019 defense agreement with Oman will allow the Royal Navy to use the extensive, deep-water port facilities at Duqm.⁴⁴ Located southwest of the Strait of Hormuz on the Arabian Sea, the facility conveys a strategic advantage in that Britain will be able to deter and act against threats to the straits from the Indian Ocean without having to operate within the Gulf itself. Since the Conservatives gained power in 2010, the United Kingdom has signed a number of agreements with GCC nations that have secured air and naval basing rights/uses in Bahrain (Mina Salman), Dubai (Al-Minhad), Oman (Musannah, Duqm), and Qatar (Al Udeid). In addition, it has increased its level of participation in military exercises, exchanges, and interaction with regional partners and allies. Exercise Saif Sareea 3, conducted in October–November 2018, brought together some 70,000 Omani and 5,000 British military personnel, with the airpower element of the exercise culminating in a joint fire exercise involving RAF Typhoons and Omani F-16s.⁴⁵

France has likewise ramped up its presence in the Arabian Sea/Horn of Africa area. France maintains a military base in its former colony of Djibouti and has negotiated an agreement with the United Arab Emirates for a permanent French military presence in the Gulf. The French base in Djibouti traces back to the 1860s; France negotiated a Defense Protocol with the Republic of Djibouti following its independence in 1977. The agreement allows France to preposition French forces and equipment in Djibouti, with the provision that France will not use Djibouti as a base for armed intervention against other countries.⁴⁶ The French presence in Djibouti (COMFOR FFDJ) is significant, totaling 1,450 military personnel. In addition to the 5th joint overseas regiment and a detachment of helicopters (two Pumas, one Gazelle), the French have positioned a detachment of Mirage 2000 fighter aircraft, a tactical transport aircraft, and a special forces group in Djibouti.⁴⁷ Situated at the outlet of the Red Sea and across the Bab el Mandeb from Yemen, the French base in Djibouti functions as a critical post for monitoring the situation in Yemen and the Horn of Africa. France has designated Djibouti as one of its two primary advance operational bases in Africa (the other is located in Côte d'Ivoire), with the base serving as a convenient staging area for French units participating in EU and NATO operations directed against pirates, violent extremists, and human smugglers.

The 2015 terrorist attacks in Paris galvanized the French government to take the offensive against radical extremist groups in North Africa and the Middle East. French airpower has taken the lead role in the former region (Operation Barkhane, 2014–) and contributes to the coalition air campaign against Daesh/ISIL in the latter (Operation Chammal, 2014–). France, like Britain, has decided to maintain a permanent presence in the Gulf following the termination of these missions. The French Command in the United Arab Emirates (COMFOR FFEAU)

and its Commander, Indian Ocean maritime zone (COMFOR ALINDIEN) are both headquartered in the UAE, and France has made arrangements to permanently station six of its Rafale fighters there. The French commands, part of its “*forces de présence*,” consist of some 650 personnel. Their mission is broad, with the French command in the UAE tasked with supporting operational deployments, developing bilateral and regional cooperation, and ensuring a solid operational intelligence picture. The Commander of the Indian Ocean maritime zone is responsible for contributing to the security of the maritime area, protecting French nationals, promoting French defense policies, facilitating military relations, and conducting military, stabilization, and peacekeeping operations when directed.⁴⁸

Both Britain and France have committed to maintaining an enduring presence in the Gulf and Arabian seas region. This part of the wider Indo-Pacific is vulnerable to almost all the risks that Britain and France believe threaten global stability and prosperity more generally. Terrorism, state-based threats, a weakening of the rules-based international order, WMD and missile proliferation, and environmental concerns combine to make the region both important and vulnerable. Europe remains heavily dependent on Gulf oil transported through the Straits of Hormuz and a good portion of the trade between Europe and East Asia flows through the Red Sea. Economics and geopolitics are pulling European powers back into the region. British and French interests and geopolitical ambitions, however, extend further to the south and east.

Western and Southern Indian Ocean

The British Empire once ruled the Indian Ocean through a network of dominions, colonies, and dependencies ringing its waters. By the last decades of the twentieth century, the number of British overseas territories had shrunk to 14, only one of which is located in the Indian Ocean. Designated the British Indian Ocean Territory (BIOT), the territory consists of a scattered collection of around 1,000 islands and rocks called the Chagos Archipelago. From an economic viewpoint, the territory seems hardly worth the trouble it has caused the United Kingdom in terms of upholding its contested claim to the territory. Were it not for the island of Diego Garcia, an outpost located smack in the middle of the Indian Ocean and large enough (~17 square miles) to accommodate a major air base, Britain might long ago have yielded the territory to its former colony Mauritius. The UK, however, correctly perceives that Diego Garcia is prime real estate in the Indian Ocean, and that Britain’s claim to a “special relationship” with the United States rests in part on what it can provide the United States in terms of intelligence, access, and global presence. Diego Garcia, located equidistant to Africa, India, and Indonesia, provides Britain with something of value in the geopolitical competition unfolding in the region. Its gigantic natural harbor, protected by coral reefs, is large and deep enough to accommodate a carrier task group while its two parallel runways are long and strong enough to accommodate even the heaviest bombers.⁴⁹

By agreement, the Americans have been allowed to construct a superb operating base equipped with wharfs, piers, repair shops, ammo storage facilities, oil tanks, and the like. In addition, the US military and other entities have crammed the island full of radars, satellite ground stations, and communication gear, sharing much of the intelligence with the UK under the rubric of the “Five Eyes” intelligence agreement.⁵⁰ The US has come to regard Diego Garcia as an essential operating base, with American long-range bombers launching from the island to support Operation Desert Storm in 1991, Operation Enduring Freedom in 2001, and Operation Iraqi Freedom in 2003. As China, Russia, and other powers build increasingly sophisticated “anti-access, area denial” systems, Diego Garcia has become an essential US outpost in the Indian Ocean as it is situated beyond the range of most missiles.⁵¹ Great Britain, at little cost to itself, contributes a great deal to the United States’ ability to project and maintain Western power in the region.

The US presence in Diego Garcia became significant in the 1960s, when the UK and the United States signed an exchange of notes authorizing the United States to construct facilities on Diego Garcia. At the request of the United States, Britain forcibly resettled the native Chagossian population, numbering between 1,000 and 1,500 people, to neighboring Mauritius or the Seychelle Islands.⁵² In June 2017, the General Assembly of the United Nations voted 94 to 15 in favor of a resolution that the International Court of Justice (ICJ) render an advisory opinion on the validity of the separation of the Chagos Archipelago from Mauritius.⁵³ The ICJ’s opinion, delivered in February 2019, is devastating. The court ruled, by a vote of 13–1, that “the process of decolonization of Mauritius was not lawfully completed when that country acceded to independence in 1968, following the separation of the Chagos Archipelago.” In addition, the Court rendered its opinion that the “United Kingdom is under obligation to bring an end to its administration of the Chagos Archipelago as rapidly as possible.”⁵⁴ Responding to the decision, the UK’s Permanent Representative to the UN, Ambassador Karen Pierce, retorted that the advisory opinion was not legally binding. The British government’s position, Pierce explained, was that the UK had no doubts about its sovereignty over the BIOT. The joint UK–US defense facilities on Diego Garcia, noted the ambassador, “play a vital role in our efforts to keep our allies and friends, including Mauritius, in the region, and beyond, safe and secure ... the world is a dangerous and an uncertain place. This facility ... is vital to efforts to combat conflict, terrorism, drugs, crime, and piracy.”⁵⁵

The French position in the Western and Southern Indian Ocean is far different from Britain’s. Two of France’s five overseas regions (*régions d’outre-mer*) are islands located in the southwest Indian Ocean, with La Réunion France’s largest overseas region in terms of population (2019 population estimate 866,506) and Mayotte its smallest (2019 population estimate 270,372).⁵⁶ France maintains a permanent presence in the Indian Ocean, organized as the Forces armées dans la zone sud de l’Océan Indien (FAZSOI). The joint command, based in Réunion, was created in 2011, with a subordinate

command located on Mayotte. A French general officer, supported by a joint staff, commands the approximately 1,600 personnel assigned to FAZSOI. All three services have forces assigned to the command, with the Second Marine Infantry Parachute Regiment (the 2e RPIMa), two helicopter equipped frigates, a patrol-boat, and a small aviation detachment based in Reunion; and a French Foreign Legion detachment and a patrol-boat based in Mayotte.⁵⁷

The French FAZSOI command has a variety of missions. Its presence protects the inhabited islands of Réunion and Mayotte, and perhaps more importantly, enforces French sovereignty over various uninhabited islands claimed by France off Madagascar and in the South Indian Ocean. French naval and air units conduct surveillance of France's maritime exclusive economic zone, enforce fishing regulations, intercept illegal migrants, and fight piracy and smugglers. France, with over one million French citizens resident in the Indian Ocean on Réunion and Mayotte, has a claim to be an Indian Ocean power.

The Eastern Indian Ocean, East Asia, and the South Pacific

Britain's withdrawal from "East of Suez" in the 1970s did not end its military relationship with its former colonies and dominions in the Indo-Pacific region. The Five Power Defence Arrangements (FPDA), a series of multilateral agreements between the UK, Australia, New Zealand, Malaysia, and Singapore, committed these Commonwealth nations to consult with one another if Malaysia or Singapore were attacked. Initially cobbled together to reassure Malaysia and Singapore that Britain was not abandoning them during a period when tensions ran high with Indonesia, the FPDA has evolved to address other concerns such as piracy, drug smuggling, and environmental issues. The five powers conduct annual naval exercises, with meetings and dinners providing a forum for defense chiefs from each country to exchange views.⁵⁸ Britain has ramped up its participation in FPDA exercises, has established a British Defense Staff (Asia Pacific) and logistics depot in Singapore, and sent four navy ships – HMS *Sutherland*, HMS *Albion*, HMS *Argyll*, and HMS *Montrose* – to the region in 2018.⁵⁹ At the 2019 Shangri-La Dialogue in Singapore, Defence Secretary Mordaunt once more confirmed that the British government intends to send HMS *Queen Elizabeth* into the region in one of its first deployments. Mordaunt pledged that Britain will be a reliable partner, engaging across the region and supporting the fundamental global values of "human rights, democracy, and respect for the rules based international order."⁶⁰

Britain continues to nurture lively bilateral ties with Australia and New Zealand as well, consisting of officer exchanges, ministerial consultations, and joint exercises. In 2013, the UK and Australia went a step further, signing the Australia–United Kingdom Defence and Security Cooperation Treaty. The treaty formalizes bilateral military cooperation, underlines mutual interest in interoperability, and pledges that the British and Australian militaries will explore the idea of collaborative procurement.⁶¹ Britain continues to honor other

bilateral arrangements in the region as well, such as its arrangement to protect Brunei with a battalion of Royal Gurkha Rifles. The British battalion, paid for by the government of Brunei, serves to dissuade Brunei's neighbors from annexing the oil rich but militarily weak nation. More significantly, the UK and Japan signed a Joint Declaration on Security Cooperation in 2017 confirming that they are each other's closest security partner in Asia and Europe respectively.⁶² The RAF deployed four Typhoons to Japan in 2017 to participate in Exercise Guardian North, setting a precedent for closer UK-Japanese interaction in the military sphere.

The British government, following the Brexit referendum, has made a concerted effort to convince the British public that leaving the European Union will not diminish Britain's stature on the world stage but rather will free Britain to act globally. Much of this rhetoric has centered on a return to East of Suez, a deeper engagement with existing partners in East Asia, and efforts to establish new relationships. Britain has been careful to avoid characterizing any of these actions as directed against China and characterizes Royal Navy and Air Force Freedom of Navigation (FON) exercises as routine reflections of its commitment to a rules-based international order.

France's territories in the Western Pacific have fewer people than its territories on the Western side of the Indian Ocean, but New Caledonia and French Polynesia are outposts it is committed to maintaining. New Caledonia, an overseas collectivity of France, held a referendum regarding whether its inhabitants wished independence in November 2018. A majority of the population voted against independence, meaning that France will retain the territory for the foreseeable future. France's permanent military footprint in New Caledonia and French Polynesia is limited. The French Armed Forces in New Caledonia (FANC) and in French Polynesia (FAPF) consist of two frigates, a few patrol-boats, five maritime surveillance aircraft, five helicopters, and four transport aircraft. Military personnel number 1,450 in New Caledonia and 900 in French Polynesia.⁶³ Their mission focuses on upholding French sovereignty, protecting fisheries, responding to natural disasters, and upholding French claims to the Exclusive Economic Zones surrounding these island territories. As a South Pacific power, France interacts on a regular basis with Australia, New Zealand, and other South Pacific nations.

France, like Britain, has made a concerted effort to rotate forces into the Eastern Indian Ocean, East Asia, and South Pacific to convey that it has interests in the region. In 2017, it sent the Jeanne d'Arc task force consisting of a helicopter landing ship and a frigate to the area. The task force visited Mumbai, traversed the Straits of Malacca, the South China Seas, and participated in exercises with the Japanese Navy before taking a detour to Australia on its route home. In 2018, a French task force interacted with regional militaries from India to Indonesia, paying a port call at Darwin. And as French Minister of Defense Florence Parly proudly pointed out at the Shangri-La Conference in Singapore in 2019, the presence of a French carrier strike group centered on the refurbished *Charles de Gaulle* underscores France's commitment to the region. Alluding to China's actions in the South China Seas, Parly explained that France would go

about preserving – with its partners – free and open access to maritime lines of communication. France would do so in its own “steady, non-confrontational, but obstinate way,” conducting FON operations in the South China Seas at least twice a year. Parly anticipates that “there will be objections, there will be dubious manoeuvres at sea. But we will not be intimidated into accepting any *fait accompli*, because what international law condemns, how could we condone?”⁶⁴

Conclusion

Only the European continent has no shoreline with the Indian or Pacific Oceans. This does not mean, however, that Europe as a whole and individual European nations have no interests in the area. As one of the leading producers of civilian and military aircraft, equipment, and expertise, Europe as a whole is deeply engaged in shaping the Indo-Pacific aerospace environment. The Indo-Pacific region is a lucrative and fast-growing market for both civilian and military aircraft, equipment, and maintenance contracts, and European firms and governments are deeply involved in the regional aerospace market. Tens of thousands of European jobs and companies depend on exports to the region, with civilian airlines and military air forces in the Indo-Pacific in turn depending on European technology and expertise.

Europe’s interest in the region extends beyond commercial sales and economics. European and national strategies have identified the region as vital yet subject to security challenges that could endanger global prosperity. From terrorism to great power rivalries, and from regional troublemakers to global warming, Europeans assess that the Indo-Pacific region presents security risks that should be mitigated. The EU, Britain, and France all frame their strategies multi-dimensionally, combining diplomacy, economics, informational, and military components, with airpower one element of their fused use of power. Britain and France recognize that soft power alone may be insufficient to protect and promote national and European interests in the region. Both are making concerted efforts to elevate their presence in the Indo-Pacific. As permanent members of the United Nations Security Council and possessing independent nuclear arsenals, Britain and France provide much of the muscle behind European hard power in the Indo-Pacific. They recognize, however, that they need partners in the region. British, French, and EU task forces, personnel, and equipment best contribute to the stability of the region when aligned with other regional actors. Europeans recognize this and are committed to working with others who share their vision of a rules-based international order beneficial to everyone’s prosperity and security.

Notes

- 1 The opinions, conclusions, and/or recommendations expressed or implied within this chapter are solely those of the author and should not be interpreted as representing the views of the Air War College, the Air University, the U.S. Air Force, the U.S. Department of Defense, or any other U.S. government agency.

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- 39 France, Ministère des Armées, 2017, p. 66.
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Part II

The Western Pacific



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5 North Korea

Daniel A. Pinkston

Introduction

The Democratic People's Republic of Korea (DPRK or North Korea) is the weakest state in Northeast Asia according to almost all indices of national power such as population, national income, quality of conventional military forces, and technology. However, Pyongyang offsets its disadvantages with asymmetric capabilities that include nuclear weapons, chemical weapons, ballistic missiles, cruise missiles, cyber, electronic warfare, special operations forces, and extensive underground facilities. While Pyongyang maintains quantitative advantages in its conventional forces, its air force consists mostly of antiquated aircraft and obsolete equipment. The [North] Korean People's Army (KPA) is a ground-centric joint force, and the KPA Air and Anti-Air Force (KPAAF) is under the operational control of the KPA General Staff. Before turning to KPAAF capabilities, missions, and organization, the following section will introduce some of the DPRK's political characteristics.

North Korean politics and strategic culture

North Korea is an authoritarian one-party state under the control of the Korean Workers Party (KWP) and its chairman Kim Jong-un, who represents the third generation of the Kim family dictatorship. Kim Jong-un officially was designated successor in September 2010 at the Third Korean Workers Party Conference, only 15 months before his father's death in December 2011. When Kim Jong-il died, Kim Jong-un was a couple of weeks shy of his 27th birthday. Nevertheless, Kim's youth did not prevent him from seizing firm control of the party, the state, the internal security institutions, and the military.

The centralized and personalistic nature of the Kim family dictatorship means that Kim Jong-un makes the final decisions over North Korea's national security policies, including how the KPA would employ force to achieve national objectives. When the Supreme People's Assembly (SPA), the DPRK's rubber-stamp legislature, convened in April 2019 for its annual meeting, North Korean media referred to Kim as the "Supreme representative of all the Korean People

(全體 朝鮮人民의 最高代表者).” The SPA subsequently amended the constitution for the fourth time in seven years to reflect Kim’s elevation in status as the North Korean leader. In the DPRK, all state activities are conducted under the leadership of the ruling KWP.¹

Chapter Four, “National Defense,” is the shortest chapter in the DPRK constitution, but Article 59 was revised in 2019 to mention Kim Jong-un by name.² The newly revised article reads,

The mission of the armed forces of the DPRK is to fight to the death to protect Comrade Kim Jong-un, head of the KWP Central Committee, to safeguard the interests of the working people, to defend the socialist system and the gains of the revolution, and to protect the freedom, independence and peace of the country from foreign aggression.³

Around the time of the April 2019 constitutional revision, DPRK media began to refer to Kim Jong-un as the “supreme commander of the armed forces of the DPRK (朝鮮民主主義人民共和國 武力 最高司令官)” instead of “supreme commander of the Korean People’s Army (朝鮮人民軍 最高司令官)” (emphasis added). This new title reflects a new state position established by the SPA and stipulated in the 2019 constitution.⁴

Party and state goals

Since all DPRK state activities are conducted under the guidance of the Korean Workers Party, the party’s goals are central to understanding the behavior of the state and the military. The KWP Bylaws, party organization, and official declarations carried by DPRK media clearly convey North Korea’s strategic goals and objectives. The party’s consistent aim has been to

build a strong and prosperous socialist country in the northern part of the republic (North Korea), and to accomplish the revolutionary task, and to carry out a people’s [民族] liberation and democratic revolution throughout the whole country [全國的 範圍; including South Korea]; the final objective is to realize the complete independence of the masses by indoctrinating all of society with *chuch’e* thought.⁵

The KWP is committed to “ousting the American imperialist aggressive military forces in South Korea and putting an end to all foreign influence and interference.”⁶ The party also seeks to “destroy the schemes of Japanese militarism to reinvade [Korea], and actively supports and encourages the South Korean people’s struggle for the democratization of society and their right to survive.”⁷ The party also is founded upon strong ethnic nationalism.⁸ The Kim dynasty emphasizes ethnic nationalism as a pillar of regime legitimacy. China is sensitive to any irredentist aspirations that threaten Chinese territorial integrity, but the DPRK has no serious intent or ability to encroach upon territories

beyond its northern border. For the foreseeable future, North Korea's territorial ambitions are limited to the southern half of the Korean peninsula.⁹

Kim Il-sung's attempt to unify Korea by force in June 1950 failed miserably even though the North had several advantages. Since the 1980s, the conventional military balance has continued to deteriorate for Pyongyang. Today South Korea's population is about twice that of the North (about 51.4 million vs. about 25.4 million), and the Republic of Korea (ROK or South Korea)'s economic output is about 50 times that of the DPRK (about \$2 trillion vs. about \$40 billion).¹⁰ The ROK also enjoys greater support from the international community, and Seoul maintains a strong security alliance with the United States. Nevertheless, the KWP has not ruled out the use of force to accomplish its goals. The DPRK is highly militarized, and the KPA is deployed and prepared to conduct offensive attacks or defensive operations on little notice.

KPA capabilities: missions and organization

Kim Jong-un exercises control of the KPA through a "sultanistic system" or "*surjong* system (首領體制)" whereby the Supreme Leader (首領) is the highest authority and leader of the Korean people (the masses), the party, the state, and the military.¹¹ Despite commanding such a large military, Kim faces the same problem that every dictator does: Who guards the guards? North Korea's well-established instruments of surveillance and repression extend into the KPA, the party, the state, mass organizations, workplaces, and schools. No one except the Great Leader can escape participation and scrutiny of his or her "organizational life (組織生活)." While the institutions and methods for social control are not relevant for this chapter, they are critical for Kim's coup-proofing the KPA and security institutions. Furthermore, the tools for controlling the military and preventing coups have implications for the command and control of military operations in wartime. In sum, the Kims have been able to use the surveillance and oversight powers of the party's General Political Bureau (GPB) to politicize and control the KPA.

Over time, the KPA was transformed from "a people's army to the party's army and finally to Kim Il-sung's army,"¹² which subsequently was bequeathed to Kim Jong-il and to Kim Jong-un. The KWP Bylaws require that all KPA political activities are conducted under the guidance of the party, and that KPA party committees be established within every military unit from the General Staff down through corps, divisions, and regiments. The committees and party organizations attached to KPA units are controlled by the GPB, which is directly subordinate to the KWP Central Committee and reports to the party chairman.

The supreme commander of the armed forces of the DPRK directly commands the Military Security Bureau (MSB; 保衛局), which provides surveillance of KPA units and conducts criminal investigations. The MSB coordinates with the Ministry of State Security and the Ministry of People's Security to investigate crimes such as theft or smuggling, but the MSB also serves as a second monitor with the GPB to ensure military units comply with party guidance and supreme command orders.

The Guard Command (護衛司令部), which consists of about 200,000 elite bodyguards, provides physical protection and security for the Kim family. The Guard Command's main mission is to prevent coups or rebellions, and to thwart any potential threats to the Kim regime.¹³ In wartime, the Guard Command would be the last line of defense for the leader and critical facilities in Pyongyang or wherever the leader might flee. Guard Command personnel are embedded with important party organizations in addition to security institutions such as the Ministry of State Security, the Ministry of the People's Armed Forces (MPAF), and the Ministry of People's Security ostensibly to provide physical protection for senior officials but also to provide surveillance and reporting back to Kim Jong-un in case of any suspicious or subversive activities.¹⁴ Guard Command personnel most likely can provide air defense protection with man-portable air defense missile systems (MANPADS).

The MPAF has at least seven bureaus: the Military (Road) Construction Bureau; the Military Mobilization Bureau; the Technology General (Engineering) Bureau; the Foreign Operations Bureau (defense attaché program); the Rear Area General Bureau; the Military Justice (Trial) Bureau; and the Military Prosecution Bureau.¹⁵ The MPAF manages administrative matters for munitions factories, construction projects utilizing conscripted military labor, and civil defense matters. However, in wartime, the MPAF is not in the chain of command for military operations; it would be relegated to rear area support such as the conversion of civilian factories to military use and the mobilization of reservists.¹⁶ Relatedly, the 2019 constitution stipulates that in wartime the State Affairs Commission (SAC) chairman is to organize and lead the State Defense Committee, but the authority and tasks of this committee, as well as the division of labor between the committee and MPAF or other state institutions are not clear.¹⁷

The KPA is a joint military force and the armed force of the DPRK. During wartime, the supreme commander of the DPRK's armed forces would have command authority over the General Staff Department (GSD), which executes military operations under the orders of the supreme leader. Recently, the GSD was reorganized to establish the Command and Intelligence Bureau [指揮情報局] to upgrade command, control, communication, computer & intelligence (C4I), and cyber capabilities.¹⁸ The GSD drafts plans and executes KPA operations for the KPA Ground Force, the KPA Navy Command, the KPA Air and Anti-Air Force, and the KPA Strategic Force. The GSD is led by the Chief of the General Staff, a First Vice Chief, and Vice Chiefs (currently four).¹⁹

As the conventional military balance has shifted against the KPA, Pyongyang increasingly has invested in asymmetric capabilities to offset conventional disadvantages.²⁰ KPA doctrine is grounded in the "four military lines" adopted at the Fifth Plenary of the Fourth Party Congress in December 1962²¹ and subsequently aggrandized in the 1992 DPRK constitution: train the army as a cadre army; modernize the army; arm all the people; and fortify the country on the basis of equipping the army and the people politically and ideologically.²²

In addition to asymmetric capabilities, the North Korean leadership emphasizes its perceived ideological superiority and its belief that KPA personnel have an advantage in resolve and fighting spirit. The KPA strategy is to achieve victories through rapid mobility and a logistics chain that would emphasize a greater ratio of equipment to food compared to most other militaries.²³ One obvious solution would be seizing food, fuel, medicine, and other critical supplies in newly occupied territory as the KPA advances south. The ROK Ministry of National Defense (MND) estimates that North Korea has stockpiled enough food, petroleum, oils and lubricants (POL), and munitions for about 1–3 months of war. During wartime, the DPRK should be able to convert at least 300 civilian factories to military use for the production of weapons, munitions, and other military equipment. Nevertheless, the MND estimates that the KPA would be unable to sustain a protracted war without foreign support.²⁴

The KPA also seeks to capitalize on its quantitative advantages over ROK and U.S. combined qualitative superiority. The KPA has about 1.2 million active duty personnel including about 1.1 million ground forces, about 110,000 air force personnel, about 60,000 navy personnel, and about 10,000 personnel in the Strategic Force. The KPA also can draw upon about 7.6 million reservists and para-military personnel.²⁵ The Ground Force is comprised of ten regular army (infantry) corps, two mechanized infantry corps, the 11th Corps (Storm Corps or Special Warfare Corps), the 91st Capital Defense Corps (formerly the Pyongyang Defense Command), one anti-aircraft artillery corps (provides air defense for Pyongyang), one armored (cavalry) division, one tank division, and one artillery division.²⁶

Wartime offensive strategies

The KPA's offensive military strategy is based upon three main concepts: preemptive or surprise attack (先制奇襲); a quick decisive war or Blitzkrieg (速戰速決); and integrated or combined operations and strategy (配合戰略).²⁷ In the case of a surprise attack, North Korea would be expected to employ joint conventional operations along with asymmetric capabilities such as cyber warfare, ballistic missiles, long-range artillery, submarines, special operations forces (SOF), electronic warfare, and unmanned aerial vehicles (UAVs).²⁸ About 70 percent of KPA forces are forward-deployed south of the Pyongyang-Wŏnsan line, or about 120–100 km from the Demilitarized Zone (DMZ), so they could be mobilized for a surprise attack with little notice or warning.²⁹

The KPA Air and Anti-Air Force [Command] has about 810 fighter aircraft in its inventory and it maintains about 40 percent of them at bases south of the Pyongyang-Wŏnsan line; some of these aircraft could reach Seoul in about six minutes.³⁰ A surprise attack would target command and control centers, ports, rail facilities, supply depots, air defense systems, communication networks, and troop mobilization centers. For the KPA, it would be vital to neutralize ROK Air Force and U.S. Air Force bases and assets before they could launch a counter-air attack. North Korea's ballistic missiles probably would have the greatest

effectiveness in degrading operations at South Korean command posts and air bases. Striking South Korean facilities with chemical weapons – either with missiles or other delivery systems such as aircraft or long-range artillery – would further delay the restoration of allied air operations. In sum, the KPA would seek to accomplish the KWP’s political objectives before the ROK and its allies could muster a counterattack.

The strategy of a quick, decisive war (*Blitzkrieg*) would utilize armored and mechanized forces along with highly mobile light infantry units. These forces would follow large-scale asymmetric attacks to enable mechanized and light infantry forces to drive through ROK defenses and deep into South Korean territory.³¹ Pyongyang would seek a *fait accompli* and sue for peace before the U.S. could intervene. The KPA also would like to avoid a protracted war with the ROK given South Korea’s larger population, greater economic output, and superior industrial capacity. To achieve this objective, KPAAF missions would include interdiction, ground attack, and close air support for rapidly advancing KPA ground forces.

The KPA’s integrated or combined operations and strategy could be characterized as a Korean hybrid strategy that borrows from Mao’s guerrilla hit-and-run tactics and Soviet Red Army maneuvers, and then applying them to Korea’s mountainous terrain. This strategy would utilize regular KPA forces along with guerrilla style attacks by SOF in the rear areas to create confusion and to blur battles lines with attacks occurring at any time and place in the South.³² In this scenario, the KPAAF would utilize the An-2/Y-5 transport aircraft and helicopters to insert SOF behind enemy lines.³³ These aircraft, which can fly low and slowly through valleys, can use the terrain to make radar tracking and interception difficult. In addition to troop insertion, the An-2/Y-5 can deliver chemical and biological agents. In all three scenarios or strategies, the KPAAF could employ UAVs for reconnaissance and potentially for strike missions to support operations.³⁴

KPAAF: Aircraft and key systems

The KPAAF has about 110,000 active duty personnel.³⁵ According to the ROK Ministry of National Defense, the KPAAF has a total of about 1,640 aircraft, including about 810 fighters, about 30 reconnaissance aircraft, about 340 small transport planes including An-2/Y-5 Colts, about 170 trainers, and about 290 helicopters.³⁶ Many of the aircraft are obsolete and reportedly are in disrepair. North Korean pilots also suffer from inadequate flight training due to fuel shortages, but fewer flying hours lengthens the maintenance timetable. Furthermore, despite sanctions, the KPAAF reportedly has the ability to service and maintain its aircraft without foreign technical assistance.

Fighter aircraft

MiG-29A/B/UB (Fulcrum-A/B): The MiG-29 is a fourth-generation multirole fighter that first became operational in the Soviet Air Force during the 1980s. In

the late 1980s, North Korea probably received the export version MiG-29B, but between 1988 and 1992, the Soviet Union reportedly delivered some MiG-29s in kits for assembly and some MiG-29UB two-seat combat/trainer versions. It is uncertain whether Pyongyang has attempted and/or succeeded in upgrading the radar and avionics, but North Korea has acquired an indigenous capability to service and maintain the aircraft. The MiG-29 is North Korea's most advanced fighter aircraft and its primary missions are air defense of the capital and other strategic assets, the interception of enemy aircraft, and ground attack. The estimated inventory is 18–35, and they are assigned to Sunch'ŏn Air Base under the 1st Air Combat Division.³⁷

MiG-23ML/UB (Flogger-G/C): The MiG-23 is a third-generation fighter designed in the 1960s to replace the MiG-21. North Korea received its MiG-23s in the mid-1980s from the Soviet Union. The MiG-23ML radar has a range of 90 km (compared to 60 km for the MiG-23MF), and the MiG-23UB is a two-seat trainer. Its primary missions are the interception of enemy aircraft, air-defense, and limited ground attack. The MiG-23 inventory is 46 and the aircraft are assigned to Pukch'ang Air Base under the 1st Air Combat Division.³⁸

MiG-21F/PF/PFM/U/UM/bis/J-7/F-7 (Fishbed): The Soviet Union produced over 10,000 MiG-21s between the late 1950s and 1985. Over 2,500 models were produced under license in China as the J-7 between 1965 and 2013. Historically, more MiG-21s in its various versions have been produced than any other fighter in the world. North Korea first acquired MiG-21s in 1966, and during 1998–1999 was able to import 25 MiG-21bis, the most advanced version, from Kazakhstan. North Korea's MiG-21/F-6 serve as multirole fighters, and they are the most numerous with an inventory of 190. These aircraft are assigned to several bases under the 1st, 2nd, and 3rd Air Combat Divisions.³⁹

MiG-19/J-6/F-6/FT-6 (Farmer): The Chinese J-6 (F-6 export version) is a copy of the Soviet MiG-19. Other air forces have retired this aircraft but the KPAAF still operates it and maintains an inventory of about 100 including a small number of FT-6 two-seat trainers. The MiG-19/J-6 is an antiquated 1950s museum piece that would have limited utility in air combat against more advanced aircraft.⁴⁰

MiG-17/J-5/F-5/JJ-5 (Fresco): The MiG-17 was based upon the MiG-15 design to be a daytime interceptor. The aircraft is obsolete and was not designed for air-to-air combat; it would not perform well in a modern electronic warfare environment against more advanced fighters. Most of North Korea's MiG-17/F-5 aircraft appear to be forward deployed near the DMZ. They would be most effective in the first wave of a surprise attack against the South, providing ground attack before South Korea could launch counter-air sorties. North Korea maintains about 100 F-5/J-5 versions and about 25 JJ-5 two-seat trainers.⁴¹

MiG-15 (Fagot); *MiG-15UTI/JJ-2 (Midget)*: The MiG-15 is a Korean War vintage fighter that has been retired from combat roles. However, North Korea reportedly operates about 30 MiG-15UTI two-seat trainers. The aircraft is obsolete but might still be used occasionally for target-towing and air gunnery practice, or as decoys at airfields for deception.⁴²

Bombers and ground-attack aircraft

Il-28/H-5 (Beagle): The Il-28 was designed in the late 1940s and was the Soviet Air Force's first jet-powered bomber. The Il-28 was deployed to Chinese airfields in the early 1950s and was used towards the end of the Korean War. Some versions have been configured for reconnaissance and electronic countermeasures (ECM). According to South Korea's Ministry of National Defense, the North has about 30 aircraft configured for reconnaissance and for airborne command and control, but the ministry is not specific regarding the types of aircraft.⁴³ According to Bermudez, North Korea began developing an air-launched cruise missile for the Il-28/H-5 in the early 1990s. The aircraft can deliver 3,000 kg of ordnance including two optional torpedoes, mines, and possible air-launched cruise missiles, but the aircraft is obsolete and would not perform well in a modern air combat environment.⁴⁴

Su-25K/UBK (Frogfoot): The Su-25 is an all-weather 1980s vintage ground-attack aircraft that often is compared to the U.S. Air Force A-10 Thunderbolt. The primary mission of the Su-25 is ground attack and close air support. North Korea maintains an inventory of 34 Su-25 aircraft that are deployed to Sunch'ŏn Air Base under the 1st Air Combat Division. Armament includes internal 30-mm AO-17A cannons, optional pods with 57-mm up to 330-mm rockets, a SPPU-22 machine gun, Ch-23 (AS-7 Kerry) ASM, Ch-25 (AS-10 Karen) ASM, Ch-29 (AS-14 Kedge) ASM, and the R-60 AA-8 Aphid.⁴⁵

Q-5/A-5 (Fantan): The Q-5 (A-5 export version) is a Chinese produced aircraft modified from the MiG-19 fighter. The Q-5/A-5 mission is primarily ground attack and close-air support. There are about 40 Q-5/A-5 aircraft in the North Korean inventory deployed to the 3rd Air Combat Division's Koksan Air Base, and possibly to the 1st Air Combat Division's Panghyŏn Air Base. Armament includes a 2,000 kg bomb capacity, two Norinco Type 23-2K 23-mm cannons (100 rounds per gun), unguided rocket pods (57-mm, 90-mm, and 130-mm, and AAM (PL-2, PL-5, and PL-7)).⁴⁶

Helicopters

MD-500D/E: The MD-500 series is a light utility helicopter based on the Hughes OH-6 designed for the U.S. military in Vietnam during the 1960s. The MD-500 is relatively quiet and has been used by U.S. special forces. Hughes sold its helicopter division to McDonnell Douglas in 1984, around the time that North Korea was able to acquire 20 MD-500Ds, 66 MD-500Es, and one MD-500C all illegally through West Germany. The MD-500 was produced under license in South Korea and is used by the South Korea military, which raises concerns that North Korea could deploy its MD-500s into the South with ROK military markings. North Korea has about 50 D combat versions and about 15 E transport/logistics versions assigned to Pukch'ang Air Base East under the 1st Air Combat Division.⁴⁷

Mi-24 (Hind): The Mi-24 is an assault helicopter that can provide ground attack, close-air support, SOF transport, reconnaissance, and training missions.

The Mi-24 initially was designed for multiple roles including transport, but the aircraft saw extensive experience with Soviet forces in Afghanistan. Subsequently, the Mi-24 was configured more as an assault helicopter or “aerial fighting vehicle.” North Korea received its first deliveries of the Mi-24 in 1985 and has about 20 in its inventory.⁴⁸

Mi-26 (Halo): The Mi-26 is the world’s largest heavy-lift helicopter and is widely used for both civilian and military purposes. The Mi-26 can be used for transport and logistics, anti-submarine warfare (ASW), search and rescue, medivac, and SOF. It can carry 90 infantry or SOF with gear and a cargo capacity of 20 metric tons. North Korea has four Mi-26 helicopters and they are assigned to Pukch’ang Air Base (East) under the 5th Air Transport Division.⁴⁹

Mi-8/Mi-17 (Hip): The Mi-8 is a multirole helicopter than can be used for transport, VIP transport, ground attack, close-air support, electronic warfare, search and rescue, reconnaissance, SOF, and as an airborne command post. Its utility, versatility, and long production run have made it one of the most popular helicopters in the world today. The Mi-8 has a capacity of 24 passengers, 12 medivac passengers, 4,000kg of cargo, or 3,000kg of external cargo carried by sling. It can carry 1,500kg of armament or ordnance including bombs, rockets, anti-tank missiles, machine guns.⁵⁰

Mi-4 (Hound)/Harbin Z-5: The Mi-4 is a light utility helicopter that can be used for transport and logistics, SOF, search and rescue, and medevac. The Mi-4 is an old aircraft that has been retired elsewhere but some North Korean Mi-4s are probably still in service. Depending upon the configuration of the remaining models, the primary missions most likely are transport, SOF, limited ground attack, and close-air support. The Mi-4 can carry 16 troops or eight medevac patients, and it can be armed with four optional rocket pods. North Korea has about 40 Mi-4/Harbin Z-5 helicopters probably assigned to Pukch’ang Air Base East under either the 1st Air Combat Division, the 5th Air Transport Division, or both.⁵¹

Mi-2 (Hoplite) (light utility/training helicopter): The multi-purpose Mi-2 can be used for light ground attack, close-air support, transport and logistics, reconnaissance, search and rescue, early warning, medivac, SOF, airborne command post, and training. Numerous versions have been manufactured for various missions and roles. It has a capacity of eight passengers, 700kg internal cargo, or 800kg of external cargo. North Korea has about 100 Mi-2 helicopters deployed to Panghyŏn Air Base and Paekch’ŏn Air Base under the 1st Air Combat Division, T’aet’an Air Base under the 3rd Air Combat Division, and to Pukch’ang Air Base East and Inp’ung-ri Airfield (also known as Sŏnch’ŏn Airfield) under the 5th Air Transport Division.⁵²

Transport aircraft

An-2/Y-5 (Colt): The An-2/Y-5 Colt (the Y-5 is the Chinese version) is a single-engine propeller driven biplane with multiple purposes. The An-2 was developed for agricultural and forestry use, but it can provide transport, reconnaissance, search and rescue, light ground attack, and close-air support. The

An-2/Y-5 can also be used for troop insertion and could be configured to deliver chemical or biological weapons. The 1940s vintage aircraft flies slowly and can fly low through valleys to avoid radar. North Korea maintains 200–300 An-2/Y-5 aircraft for multiple purposes. The An-2/Y-5 is versatile and can operate from short unpaved airstrips.⁵³

Air Koryo civilian transport aircraft

Air Koryo is North Korea's national airline that operates limited international flights from Pyongyang to Beijing, Shenyang, and Vladivostok. In recent years, Air Koryo has received new aircraft to modernize its fleet. In August 2019, media reported that Air Koryo would resume international flights to Macau, which has been an entrepot for North Korean financial transactions and trade, including illicit arms exports. Air Koryo is controlled by the Civil Aviation General Bureau under the KPA, which provides pilots for the aircraft. In wartime, the aircraft would be mobilized for military use. Pyongyang Sunan International Airport is the hub for Air Koryo and it has offices in Pyongyang, Beijing, Shenyang, Shanghai, Dandong, Moscow, Vladivostok, Berlin, and Kuwait. Information on Air Koryo flights is available at: www.airkoryo.com.kp/.

An-24 (Coke): The An-24 is a durable all-weather turboprop driven transport aircraft. North Korea received its first delivery of the An-24 in 1966 and currently operates six of them with two aircraft in storage or converted to possible military use. Air Koryo flies the An-24 to domestic destinations with irregular service or charter flights. The An-24 can carry 44–50 passengers in its airline configuration. It has a range of 640 km and can reach a speed of 450 kph.⁵⁴

An-148–100B: The An-148–100B is a regional passenger jet. Design work began in the early 1990s and the first test-flight was in 2004. North Korea received one An-148–100B in 2013 and one more in 2015. In August 2019, media reported that Air Koryo would resume international flights to Macau. If flights resume, the An-148–100B likely would fly this route. In 2014, DPRK state media broadcast video footage showing Kim Jong-un in the captain's seat pretending to pilot the newly acquired AN-148–100B. Although Kim sat in the captain's seat during the short flight and state propaganda tried to depict Kim as flying the aircraft, it was clear that the pilot in the right-side first officer's seat was controlling the aircraft. One of the An-148–100B aircraft apparently has been converted into a VIP transport for Kim Jong-un and the senior leadership. This aircraft can carry up to 85 passengers and a maximum payload of 9 tons. The range is 3,600 km and the cruising speed is 800 kph.⁵⁵

Il-62M (Classic): The Il-62 is an all-weather, long-range turbojet passenger aircraft developed in the 1960s. North Korea received its first Il-62 in 1979. North Korea received six Il-62s but in recent years, Air Koryo has been operating only two of these aircraft. One has been converted into “*Ch'ammae-1* (참매; goshawk),” a VIP transport and the North Korean version of “Air Force One” that serves as the personal aircraft of Kim Jong-un and the national leadership. The Il-62 can carry 168 passengers and 23 tons of cargo (maximum payload).

It has a range of 7,800km with the maximum payload or 10,700km with maximum fuel reserve.⁵⁶

Il-76TD (Candid): The Il-76TD is an all-weather, unarmed heavy-lift transport aircraft. The Il-76 cargo hold is pressurized and can be used to transport people and cargo, including heavy machinery. According to a Russian website that tracks and monitors the status of Soviet/Russian-made aircraft, North Korea operates three Il-62TDs and maintains three in storage. Some Il-76 variants have been configured for military use including troop and SOF transport, electronic warfare, airborne early warning, and electronic countermeasures. However, it is uncertain whether North Korea has modified any of its Il-76s for missions other than heavy transport. The maximum payload is 50 tons, and the range is 4,200km.⁵⁷

Tu-134B (Crusty): The Tu-134B is a 1960s vintage mid-range twin-jet airliner that can carry 80 passengers and 19,600kg in its airliner configuration. Tupolev produced 852 variants and the aircraft was quite popular in Soviet-bloc countries. However, the aircraft mostly has been phased out. North Korea received two Tu-134B aircraft in 1984 and still operates them; only four other Tu-134B passenger planes still fly in the rest of the world. This aircraft has a range of 2,700km.⁵⁸

Tu-154B (Careless): The Tu-154 is three-engine medium-range passenger jetliner that was designed in the 1960s. This aircraft can carry 160–180 passengers to a range of 6,600km at a cruising speed of 950kph. North Korea reportedly flies two Tu-154 planes and keeps two in storage, but the other two aircraft could have been configured for military use such as electronic warfare or reconnaissance.⁵⁹

Tu-204–100/Tu-204–300: The Tu-204 is a 1990s vintage twin-engine medium-range jet airliner and Air Koryo's most modern passenger aircraft. There are two models in the inventory; the Tu-204–100 has a range of 6,900km and the Tu-204–300 has a range of 9,250km.⁶⁰

Il-18 (Coot): The Il-18 was developed in the 1950s as a passenger airliner but the Soviet Union also configured the aircraft for medevac, maritime patrol, electronic intelligence, and as an airborne command post. Air Koryo operates one Il-18 as a passenger transport for charters or irregularly scheduled flights on domestic routes. The other aircraft is in storage or could have been reconfigured for military use such as electronic warfare or reconnaissance. The Il-18 has a range of 6,500km, a speed of 675kph, and a payload capacity of 29,000kg.⁶¹

Unmanned aerial vehicles

The DPRK has been interested in acquiring UAV technology for about 50 years, but North Korea reportedly procured its first UAVs from China around 1988–1990.⁶² In the 1990s, Pyongyang began to reverse-engineer UAVs received from China, Russia, and Syria. Furthermore, North Korea reportedly obtained technology for the U.S.-made Beechcraft MQM-107D Streaker target UAV from a “Middle Eastern country,” and subsequently reverse-engineered

and modified it to make a new UAV that can perform both reconnaissance and ground-attack missions.⁶³ North Korea has about 300 UAVs in various models and configurations, and the number is probably increasing.⁶⁴ There are four basic models in the North Korean inventory. All four versions are for reconnaissance, but one can also be configured for ground attack. Pyongyang also reportedly is developing a new multipurpose UAV.⁶⁵

KPAAF missions and order of battle

In peacetime, the minimum strategic goal of the KWP and DPRK leadership is to survive. In this context, the role of the KPA is to deter enemy attacks or aggression. The primary mission of the KPAAF is to provide reconnaissance and early warning, which includes patrolling DPRK air space and monitoring activities in North Korea's exclusive economic zones (EEZ). The DPRK also claims a 50-NM military boundary line with the objective of prohibiting foreign military vessels or aircraft from approaching DPRK territory. The KPAAF divides the country into three main regions for these missions. The 1st Air Combat Division is responsible for the capital region and the northwestern area, the 2nd Air Combat Division covers the east coast area, and the 3rd Air Combat Division is responsible for the southwest and DMZ area.

Under the KPAAF Headquarters (HQ) in Pyongyang is the National Air Defense HQ, which oversees the three air defense sectors and three radar regiments.⁶⁶ North Korea operates over "50 ground control intercept and early warning radar facilities" with some of the equipment underground.⁶⁷ While North Korea maintains a dense, layered air defense network, many of the radar systems are antiquated and susceptible to countermeasures. On the other hand, Pyongyang has been working to modernize its radars and has been developing GPS and radar jamming capabilities.⁶⁸

North Korea's fighters and interceptors are antiquated compared to those in the ROK Air Force inventory. Furthermore, inadequate flight training leaves North Korea at an even greater disadvantage. In an inter-Korean air war, the ROK should be expected to establish air superiority quickly; the outcome would be more rapid and decisive in the case of combined U.S. and ROK air operations. Therefore, North Korea's best air defense consists of its surface-to-air missile (SAM) assets.

The country is divided into three air defense regions that roughly coincide with the three air combat divisions as mentioned above. The Air Training Division is located in the northeast and it has a secondary mission of air defense for that region. The 5th Transport Division and the 6th Transport Division are responsible for air transport in the western and eastern part of the country respectively. North Korea maintains about 113 air bases or landing strips that can be utilized as air fields.⁶⁹ The main air facilities include about 22 paved runways and 11 unpaved runways.⁷⁰ Each air defense region includes an air combat division, SAM units, radars, and anti-aircraft artillery. The KPAAF maintains about 19–20 SAM brigades dispersed across the three sectors.⁷¹ North

Korea reportedly has dispersed the air defense assets fairly evenly across the regions but with some resources more concentrated around the capital and southwestern regions.⁷²

***West coast and Pyongyang area
(1st Air Combat Division)***

The 1st Air Combat Division provides air defense for Pyongyang as well as the Yŏngbyŏn Nuclear Complex, and the Sŏhae Space Launch Center on the north-western coast near Tongch'ang-ri, North Py'ŏng'an Province. The division headquarters is located at Kaech'ŏn Air Base, South P'yŏng'an Province, about 80 km north of Pyongyang and only about 12 km east of the Yŏngbyŏn Nuclear Complex. Kaech'ŏn Air Base is a home base for MiG-19/J-6/F-6 (Farmer), a second-generation 1950s vintage jet fighter with limited utility in a modern warfare environment. The North Korean inventory primarily if not exclusively consists of the F-6, which is a Chinese produced clone and export version of the Soviet MiG-19. Onchŏn Air Base, South P'yŏng'an Province also hosts a regiment of F-6/MiG-19 fighters.

Sunch'ŏn Air Base, South P'yŏng'an Province is the home base for a regiment of fourth-generation MiG-29A/B/UB (Fulcrum-A/B) multirole fighters, North Korea's most advanced fighter aircraft. The base has underground storage facilities for aircraft in a mountain nearby the flight line. Sunch'ŏn also is home to a ground attack regiment of Su-25K/UBK (Frogfoot) aircraft that many find comparable to the U.S. Air Force A-10 Thunderbolt. In the case of a KPA blitzkrieg-style surprise attack, the Su-25 aircraft should be expected to participate by providing ground attack and close-air support for KPA ground forces trying to break through ROK defenses.

Pukch'ang Air Base, South P'yŏng'an Province, about 55 km north of Pyongyang, is another major airbase defending the capital region. Pukch'ang hosts a fighter regiment of MiG-23ML/UB (Flogger-G/C) aircraft and a fighter-bomber regiment of MiG-21F/PF/PFM/U/UM/bis/F-7 (Fishbed) and F-6/MiG-19 fighters. The MiG-23 is a third-generation fighter and North Korea's second most advanced fighter. However, the swept-wing aircraft can be unstable in flight, which could be problematic for pilots who do not receive adequate flight training.

Adjacent to Pukch'ang Air Base or physically collocated is Pukch'ang Air Base East, which is also known as Yonggang-ri Air Base or Airfield. However, this facility hosts two helicopter regiments – one for ground attack and another for transport. This base hosts the Mi-26 (Halo) heavy-lift helicopter, which probably is assigned to the 5th Transport Air Division, but this multirole helicopter could transport SOF and provide other services to support missions under the 1st Air Combat Division. The Mi-8 (Hip), a multirole helicopter also assigned to this base, can provide civilian transport in addition to ground attack, close-air support, reconnaissance, SOF insertion, and possible electronic warfare measures. In sum, it's unclear whether the Mi-26 and Mi-8 helicopters deployed

to this base are assigned to the 1st Air Combat Division or the 5th Transport Air Division (or a combination of both).

Panghyŏn Air Base, North P'yŏng'an Province is home to a fighter-bomber regiment that hosts Mi-2 (Hoplite) utility helicopters, MiG-17/F-5 (Fresco) and/or F-7/MiG-19s, MiG-21s, and possibly the Q-5/A-5 (Fantan), a Chinese ground attack aircraft that also is deployed to Koksan Air Base (3rd Air Combat Division). The Q-5/A-5 aircraft likely would provide ground attack and close-air support for ground forces in a KPA offensive. The other fighters deployed to this base also could provide limited ground attack, but Panghyŏn Air Base is in the far northwestern part of the country near the Chinese border and about 250km from the DMZ.

The final air base in this air division is Ŭiju Air Base, North P'yŏng'an Province, next to the Chinese border. This base hosts a regiment of Il-28/H-5 (Beagle) light bombers and MiG-21s that probably would serve as fighter escorts for the bombers. North Korea has about 50–80 Il-28/H-5 aircraft, an obsolete aircraft that was the Soviet Union's first jet bomber in the late 1940s. Some of these aircraft probably have been configured for reconnaissance and electronic warfare missions, but as bombers would perform poorly in a modern war environment.

East coast area (2nd Air Combat Division)

The 2nd Air Combat Division includes six airbases and is headquartered at Hamhŭng Air Base (also known as Tŏksan Air Base), South Hamgyŏng Province. Hamhŭng Air Base hosts a fighter regiment of MiG-21PF/F-7 fighters and possibly MiG-19s or MiG-17s. Commercial satellite imagery provided by Google Earth shows what appears to be MiG-19s or MiG-17s, but they could be retired or inoperable MiG-17s being used as decoys. According to Peacock and Keymer, between 50 and 70 percent of North Korean fighter aircraft are combat ready,⁷³ so a considerable number of aircraft, especially older models, could be inoperable due to shortages of spare parts.

Wŏnsan Air Base, also known as “Kangda-ri Airfield,” is about 10km from the former Wŏnsan Air Base, which has been converted into the Wŏnsan (Kalma) International Airport. The new base is along Kalma-chŏn (Kalma Stream) in a valley next to a mountain with apparent tunneling for an underground facility. It's unclear what aircraft will be assigned to this base once it is completed, but it likely will host fighters such as the MiG-21/F-7.

Changjin Air Base, South Hamgyŏng Province is the home of North Korea's second Il-28/H-5 bomber regiment and a fighter regiment of MiG-21s. As with the 1st Air Combat Division's Ŭiju Air Base, the fighters probably would provide escorts for bombing raids, but of course, they can also be interceptors to defend against enemy intruders on the east coast.

T'ongch'ŏn Air Base, also known as Kuumni Air Base, is located in Kangwŏn Province south of Wŏnsan. This base is home to a fighter regiment of MiG-21s to provide air defense of the southeastern area near the DMZ. The base appears relatively undeveloped, but there are tunnels into a mountain near the

western end of the flight line. T'ongch'ŏn Air Base is only about 60km from the DMZ, so aircraft launched from this base could reach South Korean airspace within minutes.

Hwangsuwŏn Air Base is further north in Yanggang Province with a regiment of MiG-19 and MiG-21 fighters. This airbase is about 100km southwest of the Punggye-ri nuclear test site and likely would provide air defense against this nuclear facility in case of an air attack or intrusion. Iwŏn Air Base, South Hamgyŏng Province, also is about 100km south of the nuclear test site but right on the coast. Iwŏn Air Base hosts a fighter regiment with a tunnel entrance into a mountain about 1,200 meters north of the flight line.

Southwest and DMZ area (3rd Air Combat Division)

The 3rd Air Combat Division provides air defense for the southwestern region near the DMZ and subsequently provides a first line of air defense against South Korean intruders. Division headquarters are located at Hwangju Air Base, North Hwanghae Province. Hwangju Air Base is about 100km from the DMZ and about 40km south of Pyongyang, and a MiG-21 fighter regiment is deployed there. Running from west to east about 100km north of the DMZ lie Kwail Air Base, Hwangju Air Base, Koksan Air Base, and T'ongch'ŏn Air Base (2nd Air Combat Division).

Kwail Air Base, South Hwanghae Province, hosts two fighter-bomber regiments with underground facilities in a mountain about 2km south of the flight line. East of Hwangju Air Base is Koksan Air Base, North Hwanghae Province, and its regiment of Q-5/A-5 (Fantan) ground attack aircraft. This base also appears to have tunnels to underground facilities about 1,000 meters south of the flight line's western end.

The closest line of North Korean air bases lies about 35–50km from the DMZ. On the western side is T'aet'an Air Base, South Hwanghae Province, which is only about 50km east northeast of Paengnyŏn Island, the most northwestern of the five islands off the North Korean coast that are under South Korean control. This base host a fighter-bomber regiment (MiG-21s and possibly MiG-17s) and a Mi-2 (Hoplite) light utility helicopter unit.

East of T'aet'an Air Base is Paekch'ŏn Air Base, North Hwanghae Province. The literature refers to this base as Nuch'ŏn-ri, Pongch'ŏn-gun, South Hwanghae Province but this location is incorrect. The base is in a remote area and the closest village is Paekch'ŏn-ri. The air base and Paekch'ŏn-ri are both located in Insan-gun, North Hwanghae Province, near the border with South Hwanghae Province. Hwanghae Province was divided into separate northern and southern provinces in 1954, and the base probably was named Nuch'ŏn-ri based on information from old maps. Paekch'ŏn Air Base also hosts a fighter-bomber regiment and a Mi-2 helicopter regiment, and it appears to have an underground facility in a mountain about 400 meters south of the flight line.

The third and final facility in this forward line of air bases is Hyŏn-ri Airfield, Kangwŏn Province. This facility appears to be undeveloped but it apparently has

entrances to underground facilities about 300–400 meters east of the flight line. The air bases near the DMZ do not conduct frequent flight training or operations because of their proximity to the South. Pilots are vetted for their loyalty and they are privileged members of North Korean society, but a small number of pilots have defected to the South in the past; defecting from these bases would be easier than if attempted from bases farther north. While these bases provide the capability to launch sorties in support of a surprise attack, deployments of significant numbers of aircraft would be observable.

***West coast and Pyongyang Area
(5th Air Transport Division)***

For logistics, the 5th Air Transport Division provides air services for the western part of the country and the capital area. The headquarters is at T'aech'ŏn Air Base, North P'yŏng'an Province, about 100km north of Pyongyang. This base hosts a regiment of An-2/Y-5 transport planes. The 1940s vintage An-2/Y-5 is a multi-purpose biplane that can serve military purposes such as transport, reconnaissance, search and rescue, light ground attack, and close-air support. While the An-2/Y-5 is an antiquated relic, it could pose greater challenges than the more modern aircraft in the North Korean inventory. The An-2/Y-5 flies slowly and can fly low through valleys to avoid enemy radar. The aircraft is used for crop-dusting and easily could be configured to deliver chemical or biological weapons. Kwaksan Air Base, North P'yŏng'an Province, is another An-2/Y-5 base under the 5th Air Transport Division.

Manp'o Airfield, Chagang Province, is another An-2/Y-5 base in the far northern frontier near the Chinese border. The airfield has an unpaved 1,100-meter runway but this does not pose a problem for the An-2/Y-5. It's unclear whether Manp'o Airfield is part of the 5th or the 6th Air Transport Division, but it probably is in the 5th.

The 5th Air Transport Division has helicopter bases at Pukch'ang Air Base East, which is also known as Yonggang-ri, South P'yŏng'an Province, and at Inp'ung-ri Airfield, which is also known as Sŏnch'ŏn Airfield, North P'yŏng'an Province. Inp'ung-ri Airfield has a short runway of only 500 meters.

For civil aviation, the 5th Air Transport Division includes Pyongyang Sunan International Airport in the Sunan District of Pyongyang, about 22km north of the city center. Other airfields in Pyongyang include Mirim Airfield; Kangdong Airfield; and the Pyongyang Imhŭng-dong VIP Airfield. Air Koryo, the DPRK's national carrier, operates civilian flights from Pyongyang Sunan International Airport to Beijing, Shenyang, and Vladivostok. In August 2019, media reported that Air Koryo would resume international flights to Macau. Domestic flights are by charter or irregular schedules.

East Coast area (6th Air Transport Division)

The 6th Air Transport Division, headquartered at Sŏndŏk Air Base, South Hamgyŏng Province, provides transport and logistics support for the eastern part

of North Korea. An-2/Y-5 transport regiments are based at Söndök Air Base and Yönp'o Air Base, South Hamgyöng Province. The 6th Air Transport Division also controls the new Wönsan (Kalma) International Airport, Kangwön Province, and the nearby Wönsan VIP Airfield. Küktong Airfield, North Hamgyöng Province, also hosts an An-2/Y-5 regiment but it is unclear if the airfield is under the jurisdiction of the 6th Air Transport Division or if it is a training facility for the 8th Air Training Division. The third possibility is that the facility is used by both air divisions.

Far Northeast area (8th Air Training Division)

The 8th Air Training Division has a primary mission of pilot training and a secondary mission of air defense for the northeastern frontier. Örang Air Base, North Hamgyöng Province, is the headquarters of the division and the home of a fighter training regiment with MiG-15UTI/JJ-2/MiG-15 aircraft. The MiG-15 is a Korean War vintage fighter that has been retired from combat roles. However, North Korea reportedly operates about 30 MiG-15UTI two-seat trainers. The aircraft is obsolete but might still be used occasionally for target-towing and air gunnery practice. According to the ROK Ministry of National Defense, North Korea has about 170 trainer aircraft of various models.

Samjiyön Air Base, Yanggang Province, is in the northern frontier about 30km from the mythical Mt. Paektu. This base is the home of an F-5/JJ-5/MiG-17 (Fresco) training regiment. The MiG-17 was based upon the MiG-15 design to be a daytime interceptor, and the F-5 is a Chinese version of the aircraft. The MiG-17 is obsolete and not designed for air-to-air combat; it would not perform well in a modern electronic warfare environment against more advanced fighters.

Süng'am Airfield, Süng'am-nodongjagu, Kyöngsöng-gun, North Hamgyöng Province has an unpaved runway with trainer aircraft. This airfield is only about 15km from the Kim Ch'æk Air Force University in Ch'öngjin. Finally, Küktong Airfield hosts An-2/Y-5 transport aircraft but it is unclear if the facility is under the jurisdiction of the 6th Air Transport Division, the 8th Air Training Division, or both.

Surface-to-air missiles

The three air defense regions that roughly coincide with the air combat divisions also have about 19–20 SAM regiments supported by early warning radar, ground control intercept networks, fire-control radars, and C4I systems. Air bases, critical infrastructure, and other important facilities are defended by AAA (anti-aircraft artillery) and MANPADS. Most of North Korea's SAMs are old Soviet vintage systems that are susceptible to electronic countermeasures. However, North Korea has been working to upgrade its SAM systems; in particular, these efforts were revealed with the unveiling of the Pon'gae-5 (KN-06) system at a military parade in Pyongyang in October 2010. The Pon'gae-5

appears to be a reverse-engineered or licensed copy of the Chinese HQ-9/FT-2000 system, which is a derivative of the Russian S-300 system.⁷⁴

The KPAAF has about 350 SAM launchers and about 3,400 SAMs but keeps about half of them in storage. Most of these SAMs are later versions of the SA-2.⁷⁵ North Korea has been producing its own self-propelled AAA systems since at least the 1980s.⁷⁶ The number of SAM and AAA facilities is greater than what the KPAAF could man, so the redundant sites probably were built to offer some degree of resiliency and the opportunity to move anti-air assets to alternative sites if necessary. In sum, North Korea has invested heavily to build a robust layered air defense network after suffering the destruction from the U.S. air campaigns during the Korean War. However, most of the system is antiquated and vulnerable to countermeasures. In a conflict, ROK and U.S. forces would establish air superiority and air supremacy quickly, probably within days.

Conclusion

Pyongyang remains deadlocked in a zero-sum competition with Seoul for the future of the Korean peninsula and Korean people. Mutual deterrence is robust. The cost of another Korean war is unthinkable, but the North Korean leadership has not ruled out the use of force to unify Korea. The DPRK is an authoritarian dictatorship now under the third generation of the Kim family regime. Authoritarian systems generally are vulnerable to coups and instability, but the Kim regime has created the “almost perfect dictatorship.” Decision-making is centralized, and Kim Jong-un has firm control of the party, the state, the internal security forces, and the military.

North Korea is the most militarized nation on earth. The regime stakes its legitimacy on the guerrilla exploits of Kim Il-sung and his anti-Japanese partisans, and on the military capabilities it brandishes today. However, over the last four decades, the conventional military balance has been shifting against Pyongyang. Resource misallocation, economic inefficiency and deprivation, poor policy decisions, and economic sanctions have taken their toll. As KPA conventional capabilities have fallen behind, Pyongyang has been relying upon asymmetric capabilities to offset the growing disadvantage.

KPA forces are forward-deployed and prepositioned to execute defensive or offensive operations with little notice. The KPA would not be expected to succeed in a protracted war. The ROK Ministry of National Defense estimates that North Korea has stockpiled enough supplies for three months of conflict, but it’s hard to image a full-scale inter-Korean conflict lasting that long. The KPA is a joint force, and despite the large number of aircraft, air defense assets, personnel, and reservists, the KPA Air and Anti-Air Force would struggle to survive an onslaught from combined ROK and U.S. air power. In the case of a North Korean Blitzkrieg offensive, the KPAAF could exploit the element of surprise for a short time before being neutralized by counter air attacks from the South. In peacetime, the KPAAF can provide adequate surveillance and monitoring of DPRK territory, air space, territorial waters, and exclusive economic

zones (EEZ). In case of an extensive air attack against the DPRK, the aggressors could break through the North's vulnerable air defense system, which would leave Pyongyang with the decision whether to retaliate with a wide range of asymmetric capabilities. The risk of retaliation is high, and the costs easily could outweigh the benefits of the initial attack; hence, mutual deterrence remains robust on the Korean peninsula.

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6 Republic of Korea

Kevin Madden

I Introduction

Since the turn of the century and even before, the Republic of Korea (ROK) national security establishment has been dealing with a complex challenge: how to ensure national security in an environment of changing threats, shifting resource priorities, and increasingly negative demographics. Once a ground-centric military whose strength resided in the relatively cheap manpower of draftees and technological power of their US allies, the ROK Army dominated the defense structure and was solely focused on the potential threat of the Democratic People's Republic of Korea's (DPRK) Korean People's Army (KPA) invading across the Demilitarized Zone (DMZ) that demarcated the Korean Peninsula roughly in half. Resources were focused on equipping this force and the ROK Air Force and Navy were seen, at best, as supporting actors in the defensive structure. For half a century, this force was filled with a surplus of young men, the result of aggressive repopulation after the destructive effects of this Korean War (1951–3), in which over a million ROK soldiers and citizens died.¹

Fast forward roughly 70 years and conditions are substantially different. As Korea's economic strength grew, so did its regional political and military role and responsibility. Today, rather than just the threat across the DMZ – which still remains the primary but not all-encompassing focus – ROK security planners must concern themselves with perceived potential threats from the People's Republic of China (PRC), Russia, and Japan while also sustaining capacity to contribute to international security efforts it deems worthwhile. Being a peninsula less than an hour flight time by jet fighter away from the PRC, Russia, Japan, and of course North Korea, national security mandates the maintenance of viable and effective naval and air forces. All this must be accomplished in an environment where the need for complex weapons systems of geometrically increasing expense and increasing manpower costs must compete with the demands for the ROK government's increased social spending amid marginally increasing tax revenues.² Additionally, all this must be accomplished in an environment of increasing affluence where military service is less popular, a shortened conscription period that complicates training on increasingly sophisticated weapons systems, and declining birthrate that is forcing a substantial reduction in force structure.^{3,4}

Within this environment, the ROK Air Force (ROKAF) looms large for two key reasons. First, the ROK's location makes airpower the "weapon of first resort" mandating that Korea possess a strong anti-air capability and, arguably, offensive capability for deterrence purposes. Second, a quality air force is not cheap, and virtually every airframe acquisition is wrapped in controversy and debate given the huge outlays required. This has been driven home in modern times during decisions to buy or upgrade a host of systems including fighters, reconnaissance aircraft, aerial refuelers, and drones. It can be argued, however, that given the nature of modern and future warfare, the absence of effective airpower would place the other elements of the ROK military and in fact the ROK nation at the mercy of an aggressor possessing superior airpower.

II Missions and organization

Today's ROKAF consists of roughly 65,000 personnel and 700 aircraft.⁵ With over 450-combat aircraft, it ranks in the top ten – size wise – of world air forces. Importantly, given its preferences for US weapons system and its willingness to make substantial quality investments, it also ranks high in terms of quality.⁶

The ROKAF's motto is "To the Sky and To the Space" indicating its focus on airspace dominance and its increasing incursion into space via missiles, satellites, and manned space. Officially, its mission is two-pronged: deterrence of war during armistice conditions and to act as the "essential force ensuring victory" during wartime. To achieve both missions the ROKAF sees as essential tasks the surveillance of enemy indications as part of the national indications and warning apparatus and maintenance of "the utmost combat readiness posture" in order to respond to provocations and transition to or prosecute war. Underlying these missions is a vision that sees an elite ROKAF as "the highest power defending Korea" built on the four core values of challenge, commitment, professionalism, and teamwork⁷

The ROKAF organization is typical of many similar-sized air forces and consists of three major commands placed under the four-star general ROKAF Chief of Staff led headquarters and air staff. The major commands are the Air Force Operations Command, Air Force Education & Training Command, and Air Force Logistics Command. These three commands, respectively, have the primary function of flying, training, and supporting.

Formerly organized under two geographically arranged command structures, since 2016 the Air Combat Command has exercised sole command and control over all ROKAF fighter aircraft.⁸ The command consists of nine fighter wings and one fighter group distributed as indicated.

The Air Force Education & Training Command and Air Force Logistics Command are discussed in the following section.

As with other operational military elements of the ROK Armed Forces, peacetime operations not related to service training falls under the Chairman of the Joint Chiefs of Staff who, unlike his US counterpart, is an operational commander. In time of war, the ROKAF will fall under the US-led Air Component

Table 6.1 ROK air force fighter wings/groups

1st Fighter Wing, based at Gwangju (FA	50/F	5E/F)	
8th Fighter Wing, based at Wonju (FA	50)		
10th Fighter Wing, based at Suwon (F	4E/F	5E/F, KF	5E/F)
11th Fighter Wing, based at Daegu (F	15K)		
16th Fighter Wing, based at Yecheon (FA	50)		
17th Fighter Wing, based at Cheongju (F	35)(TA	50)	
18th Fighter Wing, based at Gangneung (F	5E/KF	5F)	
19th Fighter Wing, based at Chungju (KF	16C/D)		
20th Fighter Wing, based at Seosan (KF	16C/D)		
38th Fighter Group, based at Gunsan (KF	16C/D)		

Command (ACC) under the broader CFC umbrella. This arrangement allows for the ROKAF to leverage its massive degree of interoperability with the US to execute a combined air campaign, maximizing resources and capabilities. Of important note, ROKAF command and control is well trained and exercised through regular large and small scale exercises, but independently and in concert with their US allies.^{9,10}

III Capabilities

Training and education

ROKAF training and education is largely modeled on its US counterpart. Like the USAF, training falls under Air Force Education & Training Command.

For officers, commissioning comes from the ROK Air Force Academy, a four-year bachelor's degree program similar to the US Air Force Academy, an ROTC program residing at select universities, and an Officer Training School. Pilot training follows the typical pattern of basic and then advanced flight training. Unique to the ROK program is that after basic pilot training in the KT-1 aircraft, pilots transition to the TA-50 aircraft which allows for supersonic flight training sooner than in most other air forces. The ROKAF conducts simulator, pilot proficiency, and exercise programs that have resulted in highly capable pilots and operational squadrons. Globally, they rank amongst the best and have routinely achieved high praise during combat training exercises with their US ally since their debut at the major US exercise "Red Flag."¹¹

Professional military training is accomplished through Air Force University which offers – like the US Air Force – a captain-level Squadron Officer Course and major-level Air Command & Staff College.

The ROKAF also operates a number of technical schools for officers, non-commissioned officers, and enlisted soldiers along with air defense artillery and communications schools. The ROKAF operates a Foreign Language Institute

that utilizes native speakers to teach English and other select languages as required. To meet the need of highly educated noncommissioned officers to operate sophisticated equipment, the ROKAF operates an Air Force Aviation and Science High School. Successful completion of the secondary curriculum results in accession into the ROKAF as a technical sergeant.

The high proficiency observed across the ROKAF is a tribute both to the society and services' commitment to education and the effectiveness of the ROKAF Training and Education Command's ability to develop and adjust to meet emerging education requirements.

Acquisition and logistics

Unlike the US where services use separate acquisition budgets under Department of Defense oversight, the Defense Acquisition Program Administration (DAPA) executes Acquisition for all Ministry of National Defense programs.¹² Established in 2006, DAPA's role as captured in the Defense Acquisition Program Act is expanding the systems for and capacity of defense acquisition programs for the purposes of national security, and to realize self-reliant national defense by securing transparency, specialty, and efficiency in executing defense acquisition programs while increasing the competitiveness of the defense industry.¹³ Within DAPA, a separate Air Force Division manages air programs. This was designed to prevent the corruption seen in major acquisitions when the programs were directly under the services.

Under this system, in its simple form the ROKAF submits requirements to the ROK Joint Staff and Ministry of National Defense who, if approved, submits them to the National Assembly as part of the proposed defense budget. If approved, the requirements are funded as a set amount and passed back to DAPA to initiate acquisition. This has resulted in some friction between DAPA and the end-user ROKAF but has resulted in the successful acquisition of several major ROKAF programs including the F-15, F-16 Upgrade, F-35, AWACS, and Global Hawk.

Once systems are acquired, the maintenance and support of the ROKAF systems – along with all other logistical demands of the ROKAF – fall under the ROKAF Logistics Command which has a central authority to provide the support required within the allocated budget.

Aircraft and key systems

Currently, the ROK Air Force fighter force consists of a polyglot of aircraft representing several generations of aircraft development. Within the last decade, the ROKAF has fielded some of the world's most sophisticated systems, most of US origin or design. Because of close cooperation in operations, planning, training, and exercises with interoperable systems under the ROK-US Combined Forces Command's Air Component Command (ACC), there is a high degree of interoperability between the two air forces. However, there is also concern

amongst both ROK leaders that the ROKAF is overly dependent on the US, forcing it to continually consider non-US sources for foreign acquisition. A survey of major ROK aircraft and key systems follows.

Fighter aircraft

KF-16

Numerically, the F-16 is the dominant aircraft in the ROKAF's inventory. Designated the KF-16, acquisition began with the purchase of 36 F-16C/D Block 32¹⁴ aircraft in late 1981.¹⁵ Under the Korean Fighter Program (F-X) in 1990 the ROKAF acquired 120 F-16/Block 52 with the bulk being built in the ROK by Samsung Aerospace. In 2000 the ROKs added an additional 20 indigenously produced.¹⁶ The KF-15D Block 52 carry the LANTIRN night navigation/targeting pod system allowing the aircraft to fire the AIM-7 Sparrow, AIM-9 Sidewinder, AIM-120 AMRAAM, AGM-65 Maverick, and AGM-88 HARM missiles.¹⁷ The ROKAF plans to upgrade 134 to F-16V by November 2025. This new version will feature the APG-83 Scalable Agile Beam Radar (SABR) and SNIPER targeting pod to provide precise day and night air-to-ground targeting capability.¹⁸ The F-16 has a maximum speed of 1,472 km/h at sea level and combat range of 546 kilometers.

F-15K

The ROKAF acquired 61 F-15K Slam Eagle aircraft in two buys with deliveries beginning in 2005. While final assembly took place at Boeing's St. Louis plant, component and sub-assemblies were accomplished in joint effort with ROK companies.¹⁹ The F15K has an advanced APG-63(V)3 AESA radar and can fire the AGM-84K SLAM-ER, AGM-84H Harpoon Block II, and KEPD 350. The F-15 has a maximum speed of 2,656 km/h at high altitude and combat range of 1,965 kilometers.

F-35

With seven of 60²⁰ purchased already in country, the ROKAF has begun training on the fifth-generation stealth F-35A. The F-35 combines advanced stealth, integrated avionics, and a powerful integrated sensor package. Advanced electronic warfare capabilities enable F-35 pilots to locate and track enemy forces, jam radars, and disrupt attacks with unparalleled effectiveness.²¹ This combination allows F-35 pilots to engage ground targets at longer ranges without being detected and tracked – a capability essential to defeating the KPA's air defense systems. The F-35 has a maximum speed of 1,930 km/h and combat range of 2,800 kilometers.

FA-50

The aircraft is a joint ROK-US design. Used by the ROKAF for its aerial demonstration team and as a trainer, KAI has produced 60 of the light combat versions.

The most current versions with Block 10/20 upgrades allow the FA-50 to conduct beyond-visual-range air-to-air missions.²² The FA-50 has a maximum speed of 1,640 km/h at 30,000 feet and combat range of 1,851 kilometers.

Older fighters

The ROKAF currently operates 170 KF-5Es. The KF-5E has upgraded engines and a modified wing for greater maneuverability.²³ The aircraft have also been fitted with advanced flight controls, radar, data transfer system, heads-up-display, and sensors. The F-5E has a maximum speed of 1,740 km/h at 36,000 feet and combat range of 220 kilometers.

The ROKAF also flies about 140 F-4Es. A fast aircraft capable of carrying a large payload, the Phantom is a maintenance cost challenge and a gas guzzler. The F-4E has a maximum speed of 2,370 km/h at 40,000 feet and combat range of 680 kilometers.

KF-X Future Fighter Program

The budget for aircraft programs in 2019 grew by 51 percent to US\$4.51 billion largely due to increased funding for the KF-X Future Fighter Program. The KF-X program is an initiative to develop an indigenous high-performance multi-role fifth-generation fighter.²⁴ However, based on its current status, the project is being developed jointly with Indonesia and will likely have 4.5 generation capabilities.²⁵

Reconnaissance, AWACS, and UAVs

With major acquisitions of four Boeing 737-700IGW Airborne Warning and Control System (AWACS) E-7As under the Peace Eye program with delivery starting in August 2011²⁶ and four Northrop Grumman RQ-4 Global Hawk unmanned aerial vehicles with operations starting in December 2017, the ROKAF possesses one of the most sophisticated intelligence, surveillance, and reconnaissance (ISR) capabilities in the world.

The “Wedgetail” E-7A AWACS operates at 41,000 feet and has a range of 3,500 nautical miles. The Northrop Grumman MESA electronically scanned array radar system has all-weather, 360 degrees, 200+ nautical mile range.²⁷ The Global Hawk features high-altitude and long-endurance flight and provides persistent near-real-time coverage using imagery intelligence (IMINT), signals intelligence (SIGINT), and moving target indicator (MTI) sensors.²⁸ The ROKAF is looking to add two more Boeing E-7 Wedgetail Peace Eye AWACS to increase operational capabilities.²⁹

The ROKAF also operate eight long-range Hawker RC-800XPs for tactical aerial reconnaissance, surveillance, and SIGINT, reconnaissance models of the F-16, and two Dassault Falcon 2000s for electronic signals intelligence.³⁰ Beyond the Global Hawk, the ROKAF is working to develop an indigenous strategic UAV capable of medium altitude long endurance ISR operations.³¹

Tankers

Long desired by the ROKAF to support independent operations³² after substantial national debate, in 2015 the ROK selected under its designated KC-X program the Airbus A330 Multi Role Tanker Transport (MRTT) over the Boeing KC-46, EADS/Northrup Grumman KC-45 and other competitive proposals. The total cost of the four-aircraft program is estimated to be about US\$1.26 billion. The first aircraft was delivered in November of 2018³³ with delivery of the fourth aircraft to be completed by December 2019.³⁴ The A330 can carry 111 tons of fuel and can offload 50,000 kilograms of fuel over four hours while loitering over 1,000 nautical miles from its take-off point. In a transport configuration, it can carry up to 45 tons including 300 passengers.³⁵

Transport

The backbone of ROKAF's lift transport capability are 12 C-130H Hercules and four C-130J Super Hercules.³⁶ The C-130H, introduced into the ROKAF between 1987 and 1990³⁷ features a more powerful Allison T56-A-15 turboprop engine and reinforced structure to extend service lives. Four of the ROKAFs C-130s are C-130H-30 models with a 15-foot stretched fuselage.³⁸ In June 2012, Israel's Elbit System was contracted to execute a four-year US\$62 million upgrade on ROKAF's C-130Hs to install advanced electronic systems.³⁹ The upgrade was conducted in conjunction with Korea Aerospace Industries and included improved Multi-Mode Radar (MMR), Forward Looking Infra-Red (FLIR), SATCOM, Multi-Function Display System, and High-Speed, Low-Level Air Delivery System.⁴⁰ The C-130H can carry 92 passengers, has a maximum payload of 19,090 kilograms, cruise speed of 589 km/h, and range of 1,944 kilometers (with max payload).⁴¹

The ROKAF took delivery of its first two C-130Js in April 2014 to begin a contracted two-year training program with Lockheed Martin. The C-130J includes a stretched fuselage, new avionics with cockpit, new engines, and other modernized components.⁴² The Super Hercules also features a 15-foot stretched fuselage.⁴³ The C-130J can carry 128 passengers, has a maximum payload of 19,090 kilograms, cruise speed of 671 km/h, and range of 3,332 kilometers (with max payload).

Operationally, the ROKAF has flown C-130s to support Operations during the Gulf War in 1991 and invasion of Afghanistan in 2001. It supported the ROK "Zaytun Unit" operating in Iraq from 2004 until 2008.

For medium-range transport the ROKAF also flies 18 Construcciones Aeronauticas SA (CASA) CN-235s built both in Spain and Indonesia and acquired in the 1990s. The CN-235 can carry 51 passengers, has a payload of 6,000 kilograms, cruise speed of 450 km/h, and range of 4,355 kilometers.⁴⁴ The ROKAF contracted in 2011 with Elbit/IAI to provide a US\$29 million upgrade of the CN-235s Airborne Electronic Warfare Suites and Missile Warning Systems.⁴⁵ An additional two CN-235s were acquired in January 2003 by the ROKAF in a VIP configuration for use by the ROK President for domestic flights.⁴⁶

To further extend lift capability in support of foreign peacekeeping and wartime evacuation,⁴⁷ the ROK has considered aircraft “swaps,” most recently exploring trading trainer aircraft of ROK origin for Airbus A400M Atlas medium transports.⁴⁸

The ROKAF also flies the nation’s Boeing 747–400 (since 2010)⁴⁹ and 737–300 (since 1983) for VIP Presidential support.

Helicopters

The bulk of the ROKAF’s helicopter force is US produced/designed and relatively small. The primary ROKAF helicopter is the Sikorsky S-70, a version of the HH-60P domestically produced under license. The ROKAF flies 29 of them.⁵⁰ The aircraft has a maximum speed of 294 km/h and combat radius of 592 kilometers. The aircraft is used in both utility and combat search and rescue roles. Additionally, the ROKAF flies three further-modified versions (S-92) as Presidential Aircraft.⁵¹

The ROKAF also flies the MD 520MK Black Tiger, a light attack helicopter built under McDonnell Douglas licensed by the Korean Air Aerospace Division (KAA). The ROKAF operate 25 and the ROK Army almost 250.

The ROKAF also flies seven KA-32s for combat search and rescue, an airframe derived from the Russian KA-27. These aircraft were obtained as part of a 1995 deal to repay Russia’s debts with the ROK.⁵² Additionally, the ROKAF fly the Bell 412 (3), Eurocopter AS332 (3), and Boeing CH-47D (5).

Since 2014, KAA has worked with Boeing to develop an unmanned helicopter for high-risk civilian and military missions using the MD-500 airframe. It made its first flight in August 2019.⁵³

Trainers

The TA-50A Golden Eagle trainer is a joint venture between Lockheed Martin and Korean Aerospace Industries (KAI) with a design based on the F-16. Production began in 2001 with a maiden flight in 2002. The intention was to design a transformational supersonic trainer to better meet pilot training demands for fifth-generation fighter aircraft. While a success, the cost (US\$25 million+) has limited international purchases with only Thailand buying the trainer version. The ROK operates 50 as training aircraft.⁵⁴

Basic pilot training is achieved on the Korean Aerospace Industries KT-1 Woongbi. A single-engine turboprop, it emanates from the KTX program initiated in 1988 to develop an indigenous trainer aircraft. It was introduced as the primary trainer in 2000. The aircraft can be fitted with a variety of avionics and either an analog or glass cockpit configuration.⁵⁵ The ROKAF operate 106 KT-1s.⁵⁶

Air and missile defense

The ROKAF Air Defense Artillery Command was established in 1991 by Ministry of National Defense directive.⁵⁷ Initial capability was attained with the acquisition

of US-made HAWK (Homing All the Way Killer) IHAWK/HAWK XXI medium-range surface-to-air missile from 1979 to 1982.⁵⁸ The ROKAF is replacing its HAWK missiles with the indigenously produced medium-range KM-SAM.⁵⁹

For short-range air defense the ROKAF operates about 100 K-SAM *Chunma* tracked air defense vehicles. The system has 2x4 side-by-side launchers with 90 degree elevation and 360 degree traverse. Its *Crotale* missile can engage targets out to 9–10 kilometers at altitudes up to 5,000 kilometers.⁶⁰

Working with Russia, the ROK Agency for Defense Development (ADD) developed a version of the SA-21 Growler designated the KM-SAM.⁶¹ Deployed since 2017,⁶² each *Cheolmae-2* launcher has a range of 100+ kilometers.⁶³ It is equipped with anti-jamming capabilities and can track six targets simultaneously. The missile has a speed of Mach 4.5 and range of 40 kilometers.⁶⁴

In 2008 the ROK purchased 48 used Patriot (including PAC-2/GEM/T) missiles from Germany to replace its Nike missiles.⁶⁵ The GEM/T has an improved seeker and more effective fuse against cruise missile variants.⁶⁶ In September 2018, the ROK submitted a Letter of Request to purchase an additional 64 Patriot PAC-3/Missile Segment Enhancement (MSE) missiles for an estimated US\$501 million,⁶⁷ following up on a plan initiated in 2014.⁶⁸

ROK missile defense is achieved with the US THAAD system and US and ROK Patriot missiles. The THAAD is the most recent addition, having been deployed in 2017.⁶⁹ Aware of the KPA missile threat and limitations of the current system,⁷⁰ the ROK has sought an independent missile defense system since 2006.⁷¹ As part of ROK President Moon Jae-in's Defense Reform 2.0 project, a major investment is being made in missile interceptors⁷² as part of the three pillars of Korean defense, which include the Kill Chain, the Korea Air and Missile Defense (KAMD), and the Korea Massive Punishment and Retaliation systems.⁷³ The KAMD is being developed as an indigenous missile defense system to destroy incoming missiles at multiple layers and stages of trajectory.⁷⁴ This includes development of KM-SAM medium-range surface-to-air missiles and long-range surface-to-air missiles (L-SAM) that can intercept missiles at an altitude of less than 100 km.

*Space and satellites*⁷⁵

Part of the ROKAF motto is "... To the Space." At best, Korea's space program has been consistently advanced for over 30 years. Beginning in 1990 with a budget of just over KW9 billion, funding of the agency expanded 50 times to over KW583 billion – about US\$544 million – by 2015.⁷⁶ The ROK Government recognizes that space offers substantial opportunities for the future and that competition is stiff, as evidenced by the more than 100 space launches executed in 2019 by both government and private enterprises.⁷⁷

Officially, the bulk of the ROK's space program is under the authority of the Korea Aerospace Research institute (KARI). As expected, there is a great deal of cooperation between KARI and the ROKAF in the pursuit of defense related programs.

In 1993 KARI launched its first single-stage sounding rocket, the KSR-I.⁷⁸ On January 30, 2013 the ROK launched its first rocket into space.⁷⁹ On January 4, 2018 the ROK launched the *Chollian 2A* (GEO-KOMSAT-2A) using an indigenous SLV and satellite.⁸⁰ To date, 24 satellites have been launched. KARI operates the domestic Naro Space Center in South Jeolla Province.⁸¹

Korea intends to develop space launchers, advanced satellites, lunar probes, and deep space exploration capabilities.⁸² KARI has continued to develop increasingly powerful SLVs. Korea intends to develop a KSLV-III with a 3-ton payload for mid-level orbit and smaller payloads into geosynchronous orbit. To achieve this, the ROK must continue to leverage cooperative agreements with foreign space programs.^{83,84}

With the exception of launching satellites with military applications, the ROK's space program is principally for peaceful purposes. Simultaneously the ROK military signaled in 2015⁸⁵ that it will use national advances in space for potential military applications. The rapidity with which this goal is reached will be limited by the financial inputs required.⁸⁶

IV Challenges

Financing air superiority and defense

The ROK has a population of almost 52,000,000.⁸⁷ With a nominal Gross Domestic Product of US\$1.7 trillion,⁸⁸ it ranks as the 11th largest economy in the world. With a per capita income of US\$32,766, the ROK is an affluent society.

However, with a proposed 2020 government budget of US\$429 billion⁸⁹ a defense budget of US\$42 billion⁹⁰ represents 9.7 percent of national expenditures. This expenditure is largely justified by the security threat posed by North Korea and security threats potentially posed by regional actors such as China and Russia – and, from a ROK perspective, Japan. However, these expenditures are made in an environment of substantial public scrutiny in contest with other demands on the government.⁹¹

Beyond the ROK's recent purchases of the F-15K, F-35A, and AWACS, investment is being made in the three-pillar defense system. The 2018 budget also provided substantial funds for the Patriot Advanced Capability-3 (PAC-3) guided missile, Korean Tactical Surface-to-Surface Missiles (KTSSM), and research and development of a blackout bomb.⁹² The ROK's acquisition of the F-35 at a cost of US\$7 billion over four years (2018–21) means that for those four years 5 percent of the ROK defense budget is devoted just to paying for the F-35. The cost of ROKAF programs will bring them in direct competition with the financing of a large 450,000+ person army⁹³ and 160+ ship navy besides social programs. This constraint has limited the ROKAF's ability to purchase upgrades, instead executing periodic improvements as resources come available, often with gaps in time that skip years of technical advancements. The ROKAF will struggle to justify the budget required to attain the capabilities required to defeat DPRK aggression and deter regional competition.

Defeating the KPA^{94,95}

In the case of conflict with the DPRK, the ROKAF will likely pursue an iterative strategy of survive, rapidly gain air superiority, and join the counter-fire fight, and then support and conduct counteroffensive operations. The air campaign would be directed by the US Commander, 7th Air Force who Commands the Air Component Command of the CFC.

Despite the KPA's large number of tactical missiles and artillery pieces, a combination of effective warning, dispersion, and survivability measures will likely protect the bulk of ROK/US airpower during attack. While the KPA is expected to surge 100 percent of its combat aircraft to create a breakthrough at the DMZ and destroy key ROK capabilities, a combined response of ROK/US counter-air and robust air defense network is expected to rapidly degrade the KPA's offensive air capability, giving the ACC dominance of the air. A challenge to gaining this dominance will be working in an environment of KPA GPS jamming.⁹⁶ The ROKAF alone has the ability to rapidly destroy the KPA air force consisting of three dozen MiG-29s, 55 MiG-23s, and about 400 other fighter-bomber variants of 1950s design.

Subsequently, the ACC will transition to offensive operations to blunt the KPA ground attack and deep operations to destroy the KPA's ability to generate follow-on combat power. These missions will be carried out in a degraded but still high-threat enemy air defense environment consisting of Russian-made ground-to-air missiles and one of the largest "iron-sights" air defense forces in the world. This challenge demands the sophisticated aircraft the ROK government has invested in to facilitate a CFC ground counteroffensive which in turn will widen attack options for the ACC as KPA air defense sights are destroyed and overrun.

Following reunification of the Peninsula under ROK control, the ROKAF will play a critical role in "Phase IV" operations, maximizing lift capabilities while assuming a coordinating role for supporting coalition airlift in support of security and humanitarian operations.

Besides a host of US-designed air-to-air and air-to-ground weapons, the ROK has bought and deployed 170 German-produced Taurus KEPD 350 cruise missiles and ordered an additional 90 missiles.⁹⁷ The missile has a range in excess of 500 kilometers at Mach 1 with a 500 kilogram warhead.⁹⁸

Regional challenge of the PRC

Potentially the ROK's greatest dilemma may not be the DPRK, but the PRC. Simply put, the ROK cannot change its geographical location. Increasingly, the ROKG is concerned about being caught in conflicts between the PRC and US and so treads carefully to maintain positive relations with the PRC, its largest trading partner.

That the PRC is pursuing an expansionist policy based on "historical sovereignty" is without debate. Its actions in support of a dubious claim to sovereignty in the South China Sea are the most glaring example. The PRC continues to construct

artificial islets to create a claim to areas that lie in the Exclusive Economic Zones (EEZ) of Vietnam, Philippines, Brunei, and Malaysia. The PRC's claims of control that infringe on the sovereignty of neighbors are not limited to the South China Sea.

In 2013 the PRC announced the establishment of a "East China Sea Air Defense Identification Zone (ECSADIZ)" that would allow the PRC to "identify, monitor, control and react to aircraft entering this zone with potential air threats."⁹⁹ Part of the ADIZ overlapped about 3,000 square kilometers of South Korea's own ADIZ.¹⁰⁰ Exemplifying the tightrope of relations the ROK must walk between the US and PRC, the ROK Government did not join the US and Japan protest but instead independently protested the zone.¹⁰¹

Since the designation of the overlapping ADIZ, the PRC has repeatedly violated the KADIZ on both coasts with fighters, bombers, and reconnaissance aircraft, sometimes in concert with Russian aircraft. In each case the ROKAF responded and intercepted with the People's Liberation Army Air Force (PLAAF) aircraft eventually departing the zone. Interestingly, the ROKAF to the PLAAF aircraft was one of sentry-like aircraft, while at least one intercept of Russian planes involved the ROKAF firing warning flares and shots – indicating the care the ROKAF is taking in avoiding direct conflict with the PRC.^{102,103,104}

While this has not manifested itself in air-to-air confrontation, the potential exists if the PRC was to try and actively enforce the declared zone as a type of boundary or if it continues to more aggressively ignore the KADIZ. What is notable in this aspect of the PRC-ROK relationship is how both sides have made genuine effort to maintain diplomatic propriety. This "solution through diplomacy" approach represents the pragmatism of both states. For the ROK's part, its US\$131 billion dollar export trade relationship¹⁰⁵ with the PRC is too vital to the nation's economic health. For the PRC, this represents a stage in its long game to wrest the ROK from the clutches of the ROK-US alliance. Critical to this long-term effort is its increasing air power.

The PLAAF fields a large number of fighter aircraft of varying generations that includes some of the world's most effective aircraft such as the Chengdu J-20, a fifth-generation stealth fighter and Sukhoi Su-35, an improved Su-27 interceptor.

It also operates a sizeable fleet of strategic bombers, reconnaissance, and transport aircraft.¹⁰⁸

The PRC is engaged in a replacement program that retires older aircraft with newer, more capable ones. In terms of numbers, the PRC substantially exceeds ROKAF capabilities. However, from an operational perspective that considers the PRC's national requirements across its boundaries and the current ROK-US alliance, the PLAAF does not have the capability to dominate ROK airspace. To this point, ROK investment in advanced aircraft and air defense systems is proving to be an effective hedge against any potential effort by the PRC to dominate airspace in the region.

Table 6.2 Comparison of PLAAF and JASDF fighter aircraft¹⁰⁷

<i>ROKAF</i>		<i>PLAAF</i>	
KF-16C	118	Xian JH-7	216
F-15K	59	Sukhoi Su-30MKK	76
F-4E	71	Sukhoi Su-35	24
F-35A	60 (7)	Chengdu J-20	28
F-5E	158	Shenyang J-16	50
FA-50	60 ¹⁰⁶	Shenyang J-11	346
		Chengdu J-10	400+
		Shenyang J-8	96
		Chengdu J-7	388
TOTAL	526	TOTAL	1624

Territorial disputes with Japan

It would seem that the two leading democracies in Asia would form a natural partnership, but that would bely centuries of animosity.¹⁰⁹ After suffering two periods of subjugation by Japan with the most recent only ending in 1945, the Koreans continue to eye Japan with suspicion, even as they carry on trade of US\$82 billion.¹¹⁰ But even that relationship is not immune to the bonds of history. Both countries are currently locked in a trade dispute originating from ROK protest of Japan's abuses of Koreans during World War II.¹¹¹ To show how close economy and security are related, the ROK has withdrawn from the General Security of Military Information Agreement (GSOMIA) originally signed in 2016.¹¹² While the GSOMIA was limited, it nevertheless represented progress in the ROK and Japan establishing mutually beneficial security cooperation, a condition long encouraged by the US promotion of ROK-Japan bilateral and ROK-Japan-US trilateral security cooperation.

From a ROK perspective, the importance of an effective ROKAF is amplified. Unlike the naval balance of power where Japan shows a decided advantage, in a current one-for-one comparison the ROKAF has the edge over Japan. However, given the larger ongoing acquisition of F-35As by Japan vice the

Table 6.3 Comparison of ROK and JASDF fighter aircraft¹¹⁵

<i>ROKAF</i>		<i>JASDF</i>	
KF-16C	118	Mitsubishi F-2 ¹¹³	62
F-15K	59	F-15J	155
F-4E	71	EF/RF-4EJ	73
F-35A	60 (7)	F-35A	105 (12)
F-5E	158		
FA-50	60 ¹¹⁴		
TOTAL	526	TOTAL	395

ROK, that advantage is likely to disappear over the next two years, leaving both air forces similar in qualitative strength.

Given these conditions, air attack against one another is unlikely. However, both nations can be expected to aggressively defend their territory, sovereign or claimed, and this will continue to make Korea's possession of the Liancourt Rocks against Japan's counterclaim a potential flashpoint for air combat between the two competing powers.

V Conclusion

On June 25, 1950 as the KPA invaded the ROK supported by Soviet-made aircraft, the ROKAF had no answer. From this humble beginning, the ROKAF developed into one of the world's most lethal air forces. For years virtually all ROKAF tactics, training, and operations were largely focused on supporting ground combat operations against a potential KPA invasion. The ROKAF continued to develop, establishing integrated command and control throughout the ROKAF and air defense systems. From the 1990s forward this continual modernization resulted in an air force that is not only ready to defend its homeland but is also regionally of consequence while being capable of making international contributions such as providing airlift during the Persian Gulf War and humanitarian support in Somalia.¹¹⁶

While the KPA threat to the ROK is constant, over the past decades the security provided by the ROK-US Combined Forces Command has minimized the perceived presence of this threat amongst the ROK's population. Even as military forces under Kim Jong-un's rule develop and test ballistic missiles and nuclear weapons, ROK citizens go about daily life with a sense of security guaranteed by, amongst other components, the professionalism of the ROKAF. The ROKAF has also encouraged this sense of security by its effective, deescalating responses to challenges presented by the PRC, Russia, and Japan.

Understanding this social construct is essential in evaluating the ROKAF. By all measures, the ROKAF provides a superb model for the development of a first-class air force commensurate with its national standing and concomitant with the ROK's economic strength. The ROKAF today is a tribute to the stewardship of successive ROK national security leaders who have sustained development despite financial constraints – and the public scrutiny inherent in a democracy. It is also a tribute to the airmen who man one of the world's most technically advanced air forces. One aspect of ROKAF modernization efforts that commands attention is the effectiveness of the centralized acquisition model established with the formation of DAPA in 2006, and the ROKAF's ability to work within that model to acquire signature systems. While not the norm in many air forces it may serve as a model for improving acquisition while reducing the corruption that can creep into the process.

Importantly, the ROKAF of today may be at a watershed, and the question to be answered is what of the ROKAF of tomorrow? Given the world's slowing economic growth, it is likely that the ROK defense budget will not substantially

increase in the near term. With the increasing cost of technologically advanced aircraft, it likely means that the ROKAF will be limited on future major purchases. Within this context, even as the ROK exerts its independence in military affairs, the ROK–US alliance will remain critical to ROK security with an essential element being the highly interoperable Air Component Command.

With an eye towards the future, including space, today's ROKAF operates a modern and effective force that includes fifth-generation fighter, state-of-the art reconnaissance, modern tanker, and improved transport aircraft. It is organized and equipped to not only deter but defeat any KPA incursion or invasion, and is ready to defend the ROK's sovereignty. In short, it is a first-class air force purpose built and ready to meet its national missions.

Notes

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- 4 The Korea Herald, 2016.
- 5 ROK, 2018.
- 6 Deakin, Daniel, 2014.
- 7 ROKAF Official Website, undated.
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- 9 Ji, Dagyum, 2018.
- 10 Schanz, Marc V., 2015.
- 11 USAF Public Affairs-Nellis Air Force Base, 2008.
- 12 ROK Government, 2013.
- 13 ROK Government, 2009.
- 14 The salient feature of the Block 32 F-16s is the common engine bay capable of using either General Electric F110 or Pratt & Whitney F100 engines with minor inlet modifications.
- 15 F-16.Nat, undated.
- 16 Ibid.
- 17 Ibid.
- 18 Popular Mechanics, 2015.
- 19 Boeing Public Affairs, 2012.
- 20 Sputniknews, 2017.
- 21 Lockheed Martin, undated.
- 22 Ibid.
- 23 Military.Wikia, undated.
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- 25 Mizokami, Kyle, 2017.
- 26 AINOnline, 2011.
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- 66 Parsch, Andreas, undated.
- 67 Defense Security Cooperation Agency, 2018.
- 68 The Korea Observer, 2014.
- 69 Kettley, Sebastian, 2017.
- 70 Kang, Cherry, 2017.
- 71 SpaceWar, 2006.
- 72 Yoon, Sukjoon, 2018.
- 73 Xinhua, 2017.
- 74 Roblin, Sebastien, 2017.
- 75 The ROK Army, not Air Force, operates the nation's military ballistic missiles. Beginning in the 1980s, the ROK developed its first missile the Hyunmoo-1. The program has continued its development through to the Hyunmoo-3C that has a potential range of 1,500 kilometers with a 500-kilogram payload. This has been cause for concern in the US, as it exceeded Missile Technology Control Regime (MTCR) limitations established in 2001. However, in 2017 US President Trump scrapped payload limitations on ROK missiles and the emerging Hyunmoo-4 is estimated to be capable of a 2,000 kilogram payload.
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- 77 SpaceLaunchSchedule.Com, 2019.
- 78 Korea Aerospace Research Institute (KARI), undated a, undated b.
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- 80 Hahm, Hee-eun and Min, Yea-ji, 2018.
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7 Japan¹

Bret Perry and John Bradford

Introduction

Japan's geographic situation, industrial posture, and threat environment have driven its strategists to consistently prioritize local air dominance as a key element of national defense. As an archipelagic country lacking land borders, Japan uses airpower to maintain territorial defense, aid its naval forces' efforts to defend its lines of communication, and provide deterrence through denial. This airpower stands in the face of a deteriorating security environment with evolving challenges, especially from the Democratic People's Republic of Korea (DPRK) and the People's Republic of China (PRC). These potential adversaries both maintain capabilities that threaten the Japanese population which, just as was the case when it was decimated by strategic bombing during World War II (WWII), is densely concentrated around highly industrialized population centers. The need to challenge potential PRC capability to seize Japan's lightly populated outlying islands creates an additional airpower mission in the contemporary environment.

This chapter opens by contextualizing Japanese airpower developments and challenges by describing the nation's strategic environment. This section outlines how Japan's geography impacts its defensive posture and how Japan's industrial characteristics influence the role airpower plays in its national defense. Next, the chapter offers a brief overview of how the strategic role and employment of airpower has evolved since the end of WWII by focusing on the information in the major defense policy documents published over the last 50 years. Subsequently, this chapter provides an overview of Japan's current airpower capabilities, missions, and order of battle. It concludes with a brief examination of select current airpower issues, specifically, plans for development an indigenous fifth generation fighters, conversion of ships to carry F-35 fighters, and the acquisition of defensive strike capabilities.

Japan's geographic situation

For most of history, Japan's offshore location helped isolate it from the wars of the Asian mainland. Until the industrial revolution, only when states were at peak military strength could they mount serious campaigns across the Tsushima

Strait that separates Japan's Kyushu Island from the Korean Peninsula. Once industrialized, Japan could make that leap and conquer much of the Pacific Ocean and Asian continent. However, Chinese resistance prevented Japan's consolidation of power in the Asian heartland and the American-led allied maritime counterattack pushed Japan back across the Pacific. By 1943, U.S. forces were positioned to dominate Japan's critical Sea-Lines of Communication (SLOCs) and an airpower-supported naval campaign against Japanese maritime transport left it unable to move its forces or industrial resources. Thus, Japan was stymied, but its large population and mountainous terrain made it a troubling target for any amphibious conquest.² The U.S. then used strategic bombing to deliver mass fire effects that killed 806,000, reduced industrial output by nearly three quarters, and forced capitulation.³ The successful U.S. strategy clearly illuminated Japan's geographic vulnerabilities in the industrial age.

Contemporary Japanese security remains at the mercy of these same geographic vulnerabilities. Post-war Japan includes 6,852 generally resource-poor islands spread across an area of 377,962 km². While this is immense territory, 78 percent of the population lives in dense urban areas with 45 percent in only three metropolitan areas.⁴ Thus, it is not surprising that WWII's lessons still influence Japan's defense thinking. It relies on maritime forces to keep open the SLOCs that supply the islands; air defenses to prevent strikes on its territory; air mobility to quickly reposition defenses within the archipelago; and ground forces to repel invasions, and, if necessary, retake land territory. Of particular concern is the growing vulnerability of Japan's relatively isolated southwest islands. The forces that provide this defense are both Japanese and American, bound together by the U.S.-Japan Alliance.

Japan's military-industrial posture

Since Japan began developing its self-defense forces in the 1950s, it has followed a dual-source acquisition strategy of buying significant technology from its U.S. ally while also prioritizing the development and procurement of indigenous military equipment. Known as *kokusanaka*, or national self-reliance, this approach ensures the military hardware investments support economic development aims while hedging against overreliance on foreign technology. The strategy drives Japan to focus on sustaining indigenous industrial capacity to design, develop, and manufacture military platforms and systems, even though the resultant technology is sometimes inferior or more costly than foreign options.⁵

In the case of some particularly challenging or expensive projects, Japan employs joint ventures and technology transfer agreements with foreign firms to bolster its industry while sustaining Japanese production capacity. Examples of this approach include the development of Japan's F-2 multirole fighter which drew heavily on the American F-16 design.⁶ Due to these modifications and a suboptimal industrial structure, the F-2 unit cost spiraled higher than expected.⁷ In contrast, the success of the recent SM-3 Block IIA Cooperative Development

Program, under which the U.S. and Japan worked together to develop a ballistic missile interceptor, has recently expanded Japanese enthusiasm for cooperative defense technology programs.⁸ In another example, Japan has recently begun taking delivery of the multinationally developed F-35 multirole fighter, hosting one of two Final Assembly and Checkout (FACO) facilities in the world, and preparing to offer maintenance, overhaul, and repair services for the aircraft.⁹

Contemporary threat environment

Japan's geographic situation and industrial posture present certain opportunities for competitor states wishing to take advantage of Japanese strategic weaknesses. This is unfortunate for Japan because it is surrounded on three sides by China, the Koreans, and Russia, countries with which it shares opposing interests, conflicting territorial claims, and strategically problematic historic relations.

The most pressing of these challenges come from the PRC which has been rapidly modernizing the People's Liberation Army (PLA) and its paramilitary forces. Quantitative and qualitative expansion of PLA Air Force (PLAAF) capabilities is a key component of this Chinese effort. By 2030, China is expected to have a six-to-one advantage in sheer numbers of air superiority fighters over the Japan Air Self Defense Force (JASDF).¹⁰ This significant increase from a three-to-one Chinese advantage today illustrates PLA's focus on air superiority in the region and directly challenges JASDF airpower. This PRC fighter surge is paced by similar increases in the number of bombers and cruise missiles that complement the PLA's conventional ballistic missiles to create a complex airborne threat that can be delivered at long-range. While the ballistic missile threat can be countered with ground and maritime missile defense systems, simultaneously defeating multiple waves of numerous cruise missiles is a costly endeavor necessitating several layers of detection and engagement systems.

The PLAAF's growing capabilities are not simply assets meant for open warfare, but are being employed to pose "gray zone" challenges to Japan's control over its airspace. For instance, the PRC's 2013 establishment of an Air Defense Identification Zone (ADIZ) tested Japan's commitment to prevent creeping Chinese *de facto* control of airspace over the East China Sea.¹¹ The PRC has begun amplifying similar pressures by expanding its peacetime flight pressure over the Sea of Japan and in the Philippine Sea to include long-range aerial strike exercises.¹² These pressures drove the JASDF to reevaluate its force posture, including establishing a new Southwestern Air Division at Naha Air Base, and are responsible for an uptick in the total number of JASDF scrambles, as illustrated in Figure 7.1.¹³

To the west, Japan's airpower is also tested by the DPRK. Although the DPRK lacks the capability to contest Japanese dominance of the approaches to its national airspace, the DPRK's ballistic missile program and its ability to deliver Weapons of Mass Destruction attacks on Japanese population centers drive investment in Japan's noteworthy Ballistic Missile Defense (BMD) capabilities. Seemingly recognizing that Alliance BMD systems are insufficient

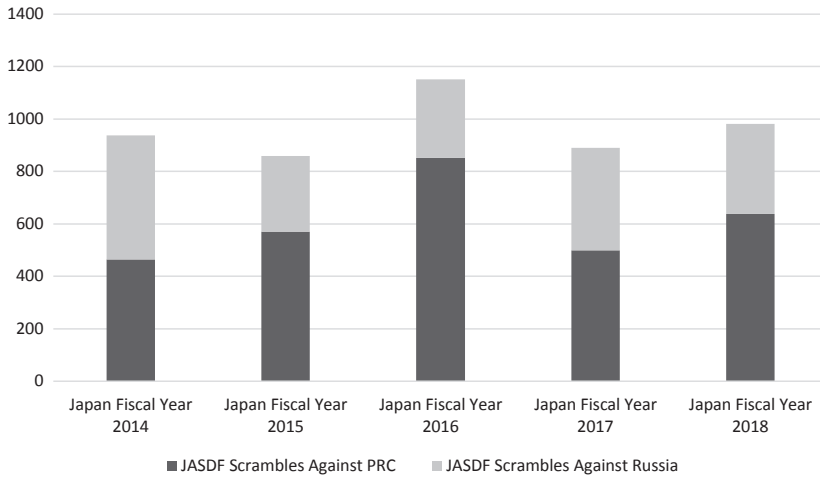


Figure 7.1 Number of JASDF scrambles against PRC and Russian aircraft.¹⁴

given the scope of destruction that would be delivered by a single warhead, Japan has recently begun focusing on resiliency measures include mass “hide and cover” population drills.

Russia poses a threat to Japan from the north. Although Japan’s concern of a Soviet invasion of Hokkaido ended with the Cold War, territorial disputes continue with Japan protesting what it regards as the illegal occupation of four Japanese islands. In recent years, while the Japanese government has made overtures to resolve these issues, Russia has reinforced its military presence on these islands and Russian bomber sorties have been on an uptick. Figure 7.1 illustrates the uptick in the number of JASDF scrambles against PRC and Russian aircraft.

The postwar evolution of Japanese airpower strategy

At the end of WWII, Japan was left with essentially no aircraft and Article IX of the U.S.-drafted “Peace Constitution” forbade Japan from maintaining “war-making potential.” Nonetheless, as the Cold War set in and with American encouragement, the Japanese Self Defense Force (SDF) was established in 1954. The JASDF was initially equipped with 148 trainers. By 1967, the JASDF had grown to include 174 F-104J Starfighter interceptors, about 100 F-86D Sabre fighters, around 300 F-86F fighters, and nearly 300 other platforms to include trainers, helicopters, and transportation aircraft.¹⁵ By 1980, the JASDF’s inventory was comprised of license-produced aircraft from the U.S. and one indigenous platform, the F-1 fighter.¹⁶ Under the Mutual Security Assistant Agreement with Japan, the U.S. encouraged the license-production model and partially funded Japanese acquisitions to both help stand up the JASDF and stimulate Japan’s aerospace industry.¹⁷

Over time, new missions have been added to the SDF's airpower requirement, but none have been eliminated. In its early years, the SDF focused its airpower efforts in only two areas: Intelligence, Surveillance, and Reconnaissance (ISR) (maritime and early warning) and air interdiction/superiority. Expeditionary airlift appeared in the mid-1990s and aerial refueling in the following decade. This section traces these developments by reviewing the key policy and strategy documents governing the procurement and tasking of Japan's air forces. The 1960 Treaty of Mutual Cooperation and Security between the United States and Japan, coupled with the security posture adopted by Prime Minister Shigeru Yoshida, established a U.S. military commitment to defend Japan and deploy forces from bases in Japan to provide for regional stability.¹⁸ Throughout most of the Cold War, the JASDF was primarily expected to conduct supplementary missions within Japanese airspace to support territorial defense. Similarly, by 1971 the Japan Maritime Self Defense Force (JMSDF) had obtained 180 aircraft, primarily for antisubmarine warfare and reconnaissance.¹⁹ As the Soviet Union strengthened its strategic forces in the Pacific, the U.S. pushed the JASDF to prioritize capability to respond to airspace territorial violations and take a larger role in the SLOC defense mission. Then, under the 1996 Revised Guidelines for U.S.–Japan Cooperation, Japan gained additional responsibility for providing support to U.S. military actions in “Situations in Areas Surrounding Japan” (SIAS-J). Following another set of Revised Guidelines and new Japanese security legislation in 2015, the SDF gained missions related to providing for the defense of U.S. operational forces.

The first National Defense Program Guidelines (NDPG) were published in 1976 and since then there have been five additional iterations. These detail the strategic policies for Japan's security and provide a basic prescription for how Japan should structure its military forces by specifying the quantities of equipment that should be procured.²⁰ Essentially, the NDPG identifies how Japan should posture itself to achieve its strategic objectives and the required force structure to do so. However, the force structure detailed in the NDPG is not binding; actual acquisition remains subject to the military procurement and budgeting system. Under this regime, Defense Agency (elevated in 2006 from a Cabinet Office to become the Defense Ministry) policymakers use the NDPG as guidance to balance requests of the three SDF services. The publication of each NDPG is paired with the issuance of a Mid Term Defense Program (MTDP). The MTDP uses the strategic guidance established in the NDPG to determine the specific procurement plan for force modernization. Drafted primarily by the Ministry of Defense (MOD) Internal Bureau, the MTDP plans across a five-year timespan and specifies the funding and target levels for each defense procurement program. This specific feedback is then incorporated into Japan's annual budget.

The 1976 NDPG introduced the “Basic Defense Force Concept” focused on ensuring that Japan was capable of defending itself against small-scale invasions independently with limited external assistance.²¹ Under this concept, the JASDF was required to monitor Japan's airspace; respond to airspace incursions through

a combination of surface-to-air missiles and fighter aircraft; interdict airborne threats, amphibious invasions, low-altitude threats; and provide air transportation.²² However, a gap between requirements and capability was illustrated by the 1976 defection of a Soviet MiG-25 pilot to Hakodate Airport, particularly the revelation that JASDF F-4Js were unable to locate it due to the lack of look-down/shoot-down radars. This propelled JASDF acquisition of the E-2C Airborne Early Warning & Control aircraft and the F-15J fighters although neither were originally in the NDPG.²³

In 1978 the United States and Japan agreed on the first set of Guidelines for Japan-US Defense Cooperation (Defense Cooperation Guidelines) to outline the roles and responsibilities for Japanese and U.S. forces and how the two forces will collaborate during emergencies.²⁴ Under the terms of the 1978 Defense Cooperation Guidelines, the JASDF was to focus on air defense, close air support, air reconnaissance, and airlift operations, including strategic airlift to help ferry military resources from the U.S. mainland. However, these operations would be conducted with notable support from U.S. forces, thereby aligning with the 1976 NDPG's Basic Defense Force prescription for the JASDF to only be capable of independently countering small-scale threats.²⁵

When the NDPG was updated in 1995, the document accounted for the tectonic changes that had recently rocked the strategic landscape including the conclusion of the Cold War, the role of technology in the resounding victory of the U.S.-led coalition in the First Gulf War, and DPRK nuclear weapons testing. Japan retained the Basic Defense Force Concept and added "contribution to a more stable security environment" as an additional policy goal.²⁶ The 1995 NDPG specifically expanded JASDF missions by assigning the JASDF four areas of responsibility:

- 1 Maintaining consistent surveillance and monitoring over Japan's airspace
- 2 Providing fighter units and ground interceptors to respond to airspace incursions
- 3 Interdicting amphibious landing invasions and providing air support to land forces
- 4 Providing air surveillance and air transportation support as needed.²⁷

Additionally, the accompanying 1995 MTDP mandated that the MOD conduct a study on the capabilities and operational functions of in-flight refueling aircraft, paving the way the acquisition of new platforms in 2001.²⁸ Furthermore, the JMSDF was required to provide airborne maritime patrol and anti-submarine warfare forces.²⁹ Table 7.1 prescribes the recommended airpower-related requirements for the JASDF and JMSDF.

These expanded SDF capabilities set the stage for the renegotiation of the bilateral Defense Cooperation Guidelines as a part of a post-Cold War American push for Japan to assume more responsibilities within the Alliance. A 1997 Revision to the Guidelines stated that Japan would be primarily responsible for all air defense operations.³⁰ Per the 1997 revision, these responsibilities were

Table 7.1 1995 NDPG airpower-related force structure guidelines³¹

<i>Service</i>	<i>Unit type</i>	<i>Force level</i>
JASDF	Aircraft Control & Warning Units	8 Groups 20 Squadrons 1 Airborne Early Warning Squadron
	Interceptor Units	9 Squadrons
	Support Fighter Units	3 Squadrons
	Air Reconnaissance Units	1 Squadron
	Air Transport Units	3 Squadrons
	Land-based Patrol Aircraft Units	13 Squadrons
JMSDF		

also to take place in an area of greater geographic scope with the SDF providing non-combat support in 40 specific areas, such as dealing with refugees, non-combatant evacuation, and search and rescue, during SIAS-J. These changes were then codified within domestic Japanese law with the passage of a security legislation package in 1999.³²

In subsequent years, the steady increase in provocative DPRK activities and U.S. post-September 11 military operations continued to shift the Japan's strategic position. The 2004 NDPG reaffirmed the previous missions while adjusting force structure to balance contemporary resources. Airpower would continue to focus on its role monitoring Japan's territorial airspace and responding to potential threats by deploying fighter aircraft. The 2004 NDPG also positioned the SDF to undertake more expeditionary operations such as international peacekeeping. Though these would remain limited in both scope and scale, they were not insignificant. For example, from 2004 to 2008 the JASDF provided three C-130H aircraft with about 200 ground personnel to Iraq to support UN airlift missions.³³ Table 7.2 shows the recommended airpower-related requirements from the 2004 NDPG in comparison with those set forth in the 1996 NDPG.³⁴ The decrease in air reconnaissance units, but addition in aerial refueling/transport aircraft reflects the adjustment made to strengthen the JASDF's long-range transportation capability.

Respecting the 2004 NDPG's focus on ensuring that the SDF can effectively monitor its airspace and territory, the accompanying MDTP prioritized the modernization of Japan's reconnaissance and early warning aircraft.³⁵ Specifically, Japan planned for systems upgrades for its E-2C Airborne Early Warning and EP-3 signals intelligence collection aircraft, continued its planned procurement of the new KC-767 tanker (Japan's first KC-767 tankers would allow for the JASDF to greatly extend the flight duration of its fighter jets), and announced plans to modify its existing C-130H transport aircraft with inflight refueling capabilities for search and rescue rotorcraft.³⁶ Japan also planned for its E-767 Airborne Early Warning & Control System (AWACS) aircraft to undergo its first major upgrade since its acquisition in 1993 to improve its radar reliability

Table 7.2 2004 NDPG airpower-related force structure guidelines with changes from 1994 NDPG force structure guidelines³⁷

<i>Service</i>	<i>Unit type</i>	<i>Force level</i>	<i>Change from 1994 NDPG</i>
JASDF	Aircraft Control & Warning Units	8 Warning Groups 20 Warning Squadrons 1 Airborne Early Warning Group (2 Squadrons)	No Change
	Fighter Aircraft Units	12 Squadrons	No Change (<i>Includes Air Support Units</i>)
	Air Reconnaissance Unit	1 Squadron	Loss of 2 Squadrons
	Air Transport Units	3 Squadrons	No Change
	Aerial Refueling/Transport Unit	1 Squadron	1 New Squadron
JMSDF	Land-based Patrol Aircraft Units	9 Squadrons	Loss of 4 Squadrons

and interoperability.³⁸ Furthermore, Japan began the P-X maritime patrol aircraft and C-X transportation aircraft development programs to indigenously develop a replacement for its aging U.S.-technology P-3 maritime patrol aircraft and C-1 transportation aircraft, respectively.³⁹

To modernize its fighter forces Japan continued its planned procurement of its domestically built F-2s and upgraded some of its F-15J Multi-Stage Improvement Program (MSIP) fighters, a license produced variant of the established McDonnell Douglas F-15 featuring some unique subsystems manufactured by Japanese industry, with an improved avionics suite including license-produced AN/APG-53(V)1 radars. Additionally, the 2004 MTDP included plans for Japan to begin modifying some of its F-15Js into RF-15Js via external/podded optical and radar sensors as a potential stop-gap replacement for its RF-4Js. Japan also indicated plans to begin replacing its F-4 multirole fighters with an undetermined new platform.⁴⁰

In 2009 Japan's Liberal Democratic Party (LDP) lost control of the government for the first time and the incoming Democratic Party of Japan (DPJ) promised a complete review of Japan's defense policies. However, the DPJ's 2010 NDPG essentially affirmed the previous strategy by reconfirming the preexisting programs while making adjustments similar to what would have been expected from the LDP given the regional threat dynamics. Persistent DPRK military activities combined with a more overt buildup by the PRC were central drivers propelling the changes. The "Dynamic Defense Force" concept replaced the 30-year old Basic Defense Force.⁴¹ This Dynamic Defense Force focused on improving ISR and modernizing the SDF to maintain more flexible capabilities better to deter diverse external threats. As elements of the Dynamic Defense

Force, both the JASDF and JMSDF were required to shift ISR resources and other platforms to support efforts in potential “gray zones” – specifically the southwestern islands. The JASDF was expected to maintain air warning and control units capable of delivering ISR throughout Japanese airspace as well as monitoring any ballistic missiles overflying Japan; the JMSDF would complement this with a combination of ship-based radars and Maritime Patrol and Reconnaissance Aircraft (MRPA).⁴² Second, the need to deter any attacks against Japan’s offshore islands required the JASDF to contribute to defense against any cruise missiles. Table 7.3 illustrates the optimization of the JASDF’s airborne surveillance aircraft to reflect these refined requirements.

The 2010 NDPG was paired with an MTDP that also made several adjustments to Japan’s airpower posture while generally following the pre-existing force modernization trajectories.⁴³ First, the 2010 MTDP required the JASDF to shift an additional fighter squadron to its Naha Air Base to enhance the JASDF’s air interdiction capabilities around its southwest islands. Second, the JASDF was tasked to transfer its Air Defense Command headquarters to the Yokota Air Base so that it could be collocated with the USAF’s Fifth Air Force headquarters. The 2010 MTDP also confirmed Japan’s plans to procure the P-1 maritime patrol aircraft and C-2 transportation aircraft while allocating resources for a life-extension of Japan’s P-3’s due to P-1 development delays. Additionally, plans were made to upgrade Japan’s E-767 radars and to install maintenance infrastructure in the southwestern region to enable continuous surveillance operations. For the JASDF’s fighters, the 2010 MTDP reaffirmed Japan’s commitment to introducing a new fighter to replace its F-4Es (the new platform was not specified because Japan had not yet made an F-35 commitment), enhance F-2 networking capabilities, and continue F-15J upgrades. However, plans for the

Table 7.3 2010 NDPG airpower-related force structure guidelines with changes from 2004 NDPG force structure guidelines⁴⁴

<i>Service</i>	<i>Unit type</i>	<i>Force level</i>	<i>Change from 2004 NDPG</i>
JASDF	Aircraft Control & Warning Units	4 Warning Groups 24 Warning Squadrons 1 Airborne Early Warning Group (2 Squadrons)	Loss of 4 Groups, but 4 new Squadrons
	Fighter Aircraft Units	12 Squadrons	No Change
	Air Reconnaissance Unit	1 Squadron	No Change
	Air Transport Units	3 Squadrons	No Change
	Aerial Refueling/Transport Unit	1 Squadron	No Change
JMSDF	Land-based Patrol Aircraft Units	9 Squadrons	No Change

RF-15J were halted; instead the 2010 MTDP planned to explore modifying F-15Js with an enhanced defensive EW capability. Lastly, the 2010 MTDP promoted the development of a new guided missile and “future fighter development” as an avenue for replacement of the JASDF’s F-2s.⁴⁵

The LDP returned to power in 2012, and in 2013 the government introduced an array of defense strategy documents including a National Security Strategy (NSS), an NDPG, and an MTDP. The NSS was a new component of the Japan defense strategy process aimed at consolidating the guiding principles for Japan’s national security over an approximate ten-year timeframe and is, therefore, broader in scope than the NDPD or NTDP. Created by Japan’s first ever National Security Council (NSC), the NSS also reflects efforts to facilitate top-down decision making and strengthen inter-agency coordination.⁴⁶ The NSS identifies Japan’s national interests and approaches that can be taken to strengthen its national security. While the guiding principles set forth in the document fundamentally reiterate Japan’s traditional focus on self-defense and existing security strategy, the NSS also highlights the need to improve its defensive capabilities in order to strengthen deterrence. Furthermore, the NSS showcases the need for Japan to “enhance the effectiveness of the US-Japan Security Arrangements,” including the Guidelines for Japan-U.S. Defense Cooperation, which further specifies the need for the SDF to be responsible for attaining air superiority.⁴⁷

The 2013 NDPG expanded upon the Dynamic Defense Concept as the appropriate response to continued PRC assertiveness.⁴⁸ This NDPG reiterated emphasis on the threat of “gray zone” activities perpetuated by potential adversaries and the requirement for continuous ISR while also amplifying the importance of Japanese capabilities to quickly counter kinetic actions. As such, the Dynamic Defense Concept was replaced by the Dynamic Joint Defense Force that placed greater emphasis joint integration amongst U.S.-Japan forces, as well as the three SDF services.

The 2013 NDPG also increased Japan’s commitment to airpower, and, in particular, air superiority capabilities. When discussing how to deal with any attacks on remote islands, air superiority is specifically cited (along with maritime supremacy) as essential for island defense. From a force capacity standpoint, the 2013 NDPGs stated that “the SDF will prioritize the development of capacities ... to ensure air superiority” as critical for achieving deterrence in the southwestern island chain. As neither the previous 2010 or 2004 NDPGs featured specific discussion around “air superiority,” its appearance in the 2013 NDPG indicated that MOD policymakers assigned greater strategic priority on this mission and its role in enabling island defense. The JASDF was still required to maintain an airborne ISR capability along with tactical fighters, but new guidance was prescribed to ensure that both types of units work in greater cohesion alongside aerial tankers to provide aerial defense for sustainable periods. Furthermore, as illustrated in Table 7.4, one fighter squadron is added at the expense of the loss of the last air reconnaissance squadron. This reflected the introduction of Japan’s first squadron of F-35As, a networked fifth generation fighter, to replace the JASDF’s F-4Es and RF-4s.

Table 7.4 2013 NDPG airpower-related force structure guidelines with changes from 2010 NDPG force structure guidelines⁴⁹

<i>Service</i>	<i>Unit type</i>	<i>Force level</i>	<i>Change from 2010 NDPG</i>
JASDF	Aircraft Warning & Control Units	8 Warning Squadrons 20 Warning Squadrons 1 Airborne Early Warning Group (3 Squadrons)	No Change (reorganization of AEWG from 3 to 2 squadrons)
	Fighter Aircraft Units	13 Squadrons	1 Addition Squadrons
	Air Reconnaissance Unit	No Squadrons	Loss of 1 Squadron
	Air Transport Units	3 Squadrons	No Change
	Aerial Refueling/Transport Unit	2 Squadrons	2 Squadrons (more aircraft)
JMSDF	Land-based Patrol Aircraft Units	9 Squadrons	No Change

The MTDP was also updated in 2013.⁵⁰ Nonetheless, the 2013 MTDP reaffirmed Japan's commitment to relocating a fighter squadron and one E-2C squadron to Naha, extending the lifespan of the P-3, procuring the P-1 and C-2, continuing F-15J and F-2 modernization plans, and maintaining future fighter studies to explore alternative replacements for the F-2. However, the 2013 MTDP did mark some significant new capability investments. First, it was the first MTDP to recognize Japan's F-35A procurement, a decision had already been formalized with the United States in 2012.⁵¹ Second, it also featured plans to procure three RQ-4 Global Hawk Unmanned Aerial Systems for ISR needs. Third, it announced plans to procure addition early warning aircraft (this would eventually evolve into a decision to buy four E-2D aircraft). Fourth, the JMSDF would procure older KC-130R tankers labeled as U.S. "Excess Defense Articles," allowing for their acquisition at a low cost (the KC-130Rs would be stripped of their in-flight refueling capabilities and retrofitted for transport). Fifth, it indicated that as Japan would not likely modernize all its F-15Js, plans would need to be made to account for their replacement. Lastly, the 2014 MTDP required the SDF to explore how it could make its airfields more resilient, including studying the use of civilian airports for contingency situations.

In April 2015, the U.S. and Japan announced a revision to the bilateral Defense Cooperation Guidelines. This was the first revision in 17 years and included exceptionally significant changes. Some of the most controversial language authorized the SDF to, under specific circumstance and with the approval of political leadership, exercise collective self-defense, an option that had been previously enabled by a 2014 cabinet-level constitutional interpretation. This would allow, for the first time, the SDF to potentially defend U.S.

forces, including those operating from bases in Japan. Indeed, the 2015 Defense Cooperation Guidelines implied that exercising such operations against the enemy weapons most likely to strike at those U.S. forces would become a Japanese responsibility when it states that the SDF, “have primary responsibility for conducting air defense operations while ensuring air superiority” and are charged with defending against tactical air threats and cruise missiles.⁵² This represented a critical responsibility that amplifies the importance of airpower to Japanese defense strategists.

The April 2015 Defense Cooperation Guidelines revision set the stage for new Security Legislation that was enacted in the face of large-scale public protest in September 2015. This pair of laws was designed to enable a “seamless response” to any security situation that may arise in order to secure the lives and peaceful livelihoods of Japanese nationals and to make a more proactive contribution to international peace and security.⁵³ It also served as the implementing legislation to enable the policies set forth in the 2015 Defense Cooperation Guidelines and defined the procedures required to authorize the SDF to employ use of weapons to protect the U.S. and other partner militaries.

In December 2018, Japan released its most recent NDPG and MTDP. The NDPG expanded the role of airpower to the defense of Japan establishing a priority to achieve a “Multi-Domain Integrated Defense Capability,” reflecting a focus on further improving interoperability, both with allied U.S. forces and within the SDF. Specifically, the NDPG documents a Japanese need to be able to counter “simultaneously multiple and complex airborne threats.” The conventional defense capabilities would complement those to protect Japan in non-traditional domains, specifically space, cyber, and electronic warfare. The introduction of these domains reflects a broader emphasis on platform survivability in response to the PRC’s numerical advantages.⁵⁴ These expanded requirements will be filled by a notable force modernization plan, including the procurement of Short Take-off and Vertical Landing (STOVL) fighters capable of operating from remote landing strips in Japan’s offshore islands and upgraded *Izumo*-class helicopter destroyers. The MOD later formally selected the F-35B, procuring 42 fighters.⁵⁵ This requirement is significant because Japan has not fielded ship-based fighters since the implementation of the 1945 constitution.

The 2018 NDPG’s emphasis on survivability and electronic warfare drives the plan to upgrade the JASDF’s fighter force. The number of F-35s, a stealthy platform designed to operate in complex electronic warfare environments, will be enlarged by a yet-to-be-determined amount, but potentially around 100 additional fighters.⁵⁶ Furthermore, Japan will procure an unspecified number of Joint Strike Missiles (JSM) for its F-35 fleet. A select number of F-15Js will be upgraded with AESA radars, advanced digital self-protective electronic warfare systems, and the ability to wield the Joint Air-to-Surface Standoff Missile (JASSM). Older pre-MSIP F-15Js will be retired rather than upgraded. Japan will also evaluate incorporating a stand-off airborne electronic attack platform into its fleet and explore the development of that jammer.⁵⁷ Ultimately, the decision to procure stand-off missiles illustrates how the MOD elected to leverage

airpower to fulfill its desire for a defensive strike capability for pre-emptive or counterbattery strikes against launch platforms.

In accordance with the 2018 MTDP, Japan's airpower capabilities will be further supported by additional high-value procurements. The SDF will invest in an indigenous Cooperative Engagement Capability prototype, modeled after the U.S. advanced sensor network of the same name, to link the JASDF's E-2Ds with JMSDF destroyers and allow them to remotely engage targets.⁵⁸ The confirmation of the RQ-4 Global Hawk procurement will provide additional information for operational decision-making. Procurement of four more KC-46A tankers and continuation of C-2 acquisition round-out the acquisitions.⁵⁹

It is notable that major new platform investments under the 2018 MTDP will all be U.S. technology. The same is true of the systems scheduled for modernization, with exception of those minor upgrades slated for the relatively new P-1. This is likely out of desire to quickly field new systems in response to the rapidly increasing threat complemented by the diplomatic value of "buying American" during the U.S. Trump Administration. However, Japan has not given up on its overall strategy to complement U.S. systems with indigenous systems that sustain its national industrial base. The MTDP specifies the continuation of the "future fighter" studies while stating that this research will be led by Japanese industry. Despite the high costs and technological challenges associated, they reflect Japan's continued commitment to avoid complete dependency on U.S. technology.

Current airpower missions, capabilities, and order of battle

Nearly half of the JASDF's more than 700 aircraft are fighters deployed in 13 squadrons.⁶⁰ This illustrates the importance of air dominance in Japan's airpower strategy. Of these, seven squadrons are made up of F-15Js and are primarily responsible for executing the JASDF's air superiority mission. Nearly half of the F-15Js are comprised of older pre-MSIP variants, limiting their current

Table 7.5 2018 NDPG airpower-related force structure guidelines with changes from 2014 NDPG force structure guidelines⁶¹

<i>Service</i>	<i>Unit type</i>	<i>Force level</i>	<i>Change from 2014 NDPG</i>
JASDF	Aircraft Control & Warning Units	28 Warning Squadrons	No Change
	Fighter Aircraft Units	1 AEW Wing (3 Squadrons)	No Change
	Air Transport Units	13 Squadrons	No Change
	Aerial Refueling/Transport Unit	3 Squadrons	No Change
JMSDF	Land-based Patrol Aircraft Units	2 Squadrons	No Change
		9 Squadrons	No Change

operational utility. Additionally, the JASDF has another F-15J squadron for aggressor training and has embedded aircraft into a development and test wing. As such, the JASDF has gradually employed some of its multirole fighters to support air superiority efforts and plans to field 147 F-35 platforms (105 F-35A and 42 F35B) to replace the aging pre-MSIP F-15Js.⁶² The remainder of the JASDF's fighter fleet is comprised of F-2 and F-4J multirole aircraft capable of providing close air support, anti-surface warfare, limited reconnaissance, and some air superiority. One squadron of RF-4EJ aircraft, a variant F-4J modified to operate reconnaissance equipment, was retired in 2019 and replaced by a squadron of F-35As assembled in Japan. Despite a planned reduction in overall inventory, the JASDF believes that the F-35's networking and stealth characteristics will allow sufficiently enabled air superiority missions.

The growing number of AWACS platforms and large fleet of maritime ISR aircraft will sustain airborne and maritime domain awareness in support of the SDF's primary missions of defending Japanese airspace and SLOCs. At the core of this effort, the JASDF operates one squadron of E-767 AWACs and plans to add two E-2C squadrons to monitor airspace and coordinate C2 in support of fighter aircraft intercepts. The JASDF also operates two squadrons of YS-11 and EC-1 aircraft which fulfill Electronic Intelligence (ELINT) mission requirements. In addition, the JASDF has acquired three RQ-4 Global Hawk aircraft which are slated to commence service in 2022. The JMSDF's maritime ISR needs are primarily fulfilled by three squadrons of P-3Cs and one squadron of EP-3 aircraft. However, the JMSDF is gradually replacing its P-3Cs with the P-1, an indigenously developed aircraft. In addition, the JASDF and JMSDF operate fixed-wing maritime patrol units focused on search and rescue mission with the former comprised of one U-125A wing and one US-1A/US-2 squadron.

The JASDF is primarily responsible for the SDF's fixed-wing transportation functions. To do so the JASDF operates one squadron of C-130H aircraft and two squadrons of C-1 aircraft. The C-1 aircraft is being replaced by the indigenously built by Kawasaki Heavy Industries C-2. This aircraft has faced significant development delays and cost-overruns, as the procurement cost for each aircraft has grown from nearly \$150M to over \$200M, and the lifecycle cost for each aircraft has increased from nearly \$387M to \$544M; these cost overruns have even driven the Ministry of Finance to suggest that the MOD replace the C-2 with an alternative, more affordable model (e.g., C-130).⁶³ The JASDF also possesses one squadron of 747-400 aircraft for VIP transport and one squadron of Gulfstream IVs for special mission transport functions. Additionally, the JMSDF possesses a fixed-wing transport capabilities, operation one squadron of King Air Beech 90 aircraft.

The final element of the SDF's air order of battle is comprised of refueling aircraft. The JASDF operates one squadron currently comprised of KC-767 tankers, but plans to grow that squadron with the addition of KC-46 aircraft. Like the KC-767, the KC-46 is derived from the Boeing 767 aircraft, and the new platforms will be 16 percent manufactured in Japan.⁶⁴ The commitment to incorporating Japanese technology into a U.S. baseline represents a clear

Table 7.6 Summary of SDF aircraft order of battle⁶⁵

<i>Service</i>	<i>Mission</i>	<i>Platform</i>	<i>Number of squadrons</i>
JASDF	Air Superiority	F-15J	7
JASDF	Multirole/Air Support	F-4EJ	2
JASDF	Multirole/Air Support	F-2	3
JASDF	Multirole/Air Support	F-35A	1 (forming; additional squadrons likely)
JASDF	Aggressor Training	F-15J	1
JASDF	Electronic Warfare	EC-1, YS-11E	1
JASDF	Tactical ISR	RF-4EJ	1 (retiring)
JMSDF	Electronic Warfare	EP-3	1
JMSDF	Maritime Patrol	P-3C, P-1	4 (1 squadron is mixed P-1s and P-3Cs)
JMSDF	Training	P-3C	1
JMSDF	Training	King Air Beach 90	1
JMSDF	Training	T-5J	1
JMSDF	Search & Rescue	US-1A/U-2	1
JASDF	Search & Rescue	U-125A	1
JASDF	AWACS	E-767	1
JASDF	AWACS	E-2C	1 (to be supplemented by E-2Ds)
JASDF	In-Flight Refueling	KC-767	1 (to be supplemented by KC-46As)
JMSDF	Transport	C-130R (Retrofitted KC-130Rs)	1
JMSDF	Transport	King Air Beach 90	1
JASDF	Transport	Gulfstream IV	1
JASDF	Transport	747-400	1
JASDF	Transport	C-130H	1
JASDF	Transport	C-1; C-2	2
JASDF	Test & Development	F-15J	1 wing

continuation of the Japanese development, production, and maintenance strategy. The sustained commitment to employing a mix of licensed-produced aircraft variants and indigenous platforms such as the F-2, P-3, and C-2 also demonstrates the sustained importance of balancing Alliance-based efficiencies with sustaining Japanese industry.

Contemporary issues in Japanese airpower

The 2018 NDPG highlights several contemporary issues impacting Japanese airpower. Three of these – the evolution of the future fighter program, the acquisition of defensive strike capabilities, and the reconfiguration of ships to launch

fixed-wing fighters – will have particularly strategic implications. All three endeavors are risky as political and resource investments, but have the potential to be significant force multipliers.

Japan formally began evaluating options for its future fighter program in the mid-2000s after the U.S. denied an export license for the F-22.⁶⁶ The main purpose of the future fighter (also referred to as the F-3) program was to not only develop an advanced replacement for the F-2 with fifth generation characteristics, but also help bolster Japan's industrial base. In 2009, the MOD tasked Mitsubishi Heavy Industries with the support of nearly 200 other Japanese firms to develop the X-2 Shinshin technology demonstrator to evaluate stealth and thrust vectoring technologies; approximately 14 other development programs were launched to explore data link, sensor, and weapons bay technologies for fifth generation aircraft.⁶⁷ X-2 development was eventually managed by the MOD's Acquisition, Technology and Logistics Agency (ATLA), a new unit stood up in October 2015 whose senior leadership featured several veterans and champions of the F-2 program. In 2016, the X-2 completed its 26-minute maiden flight.

Following the X-2's debut, Japan faced an internal debate over options regarding how to proceed with the future fighter program. One option, advocated by ATLA, was to pursue an indigenously developed F-3 solution to replace the F-2. However, due to cost constraints (this effort was estimated to cost at least \$40B), this option featured opposition from segments of the JASDF, who desired to prioritize the delivery of combat power over sustaining Japan's industrial base. Another option championed by some MOD stakeholders advocated for partnering with a foreign defense contractor to modify or license produce a variant of an existing aircraft.⁶⁸ The MOD eventually specified in the 2018 MTDP that Japan that would continue future fighter development, but evaluate international collaboration possibilities. As of writing, the MOD is reportedly in discussions with Lockheed Martin, Boeing, and BAE Systems, but seems to be leaning towards pursuing the first option to develop an indigenous F-3 platform.⁶⁹ Ultimately, despite the increasingly urgent mission requirement to replace the F-2, industrial base concerns will continue to drive the evolution of Japan's future fighter program.

Japan has subtly begun exploring the acquisition of defensive strike capabilities – some of them air-based – to deter and preempt potential DPRK launch activities. Given Japan's focus on self-defense, the public aspects of these discussions have been carefully managed. Early in the process, the MOD and JMSDF evaluated converting maritime-based anti-ship missiles into a "Japanese version of the Tomahawk" cruise missile.⁷⁰ However, Japan later documented that selection of air-based strike weapons would be a better option. Specifically, in the 2018 MTDP, the MOD stated that the SDF would procure JASSM and the JSM. The 2018 MTDP and NDPG language couches that these stand-off missiles would be used to repel any invasion on Japan's remote islands while also containing the following language:

Based on basic role and mission sharing between Japan and the U.S., in order to strengthen the deterrent of the Japan-U.S. Alliance as a whole,

Japan will continue to study a potential form of response capability to address the means for missile launch and related facilities and will take necessary measures.⁷¹

Many interpret this as a tacit admission of Japan's evaluation of defensive strike capability as a part of its missile defense strategy. That said, it is important to note that the acquisition of stand-off weapons is just one step towards the attainment of the actual capability to conduct such a strike. A complete kill chain will also require capabilities for target identification, issuance of guidance to the firing platform, and assessment of effects.⁷² Developing the capabilities to perform these functions in a contested environment will drive additional requirements.

Whereas the government's public affairs discussion of defensive strike capabilities has been somewhat muted, Japan has been more direct regarding its plans to reconfigure the *Izumo*-class helicopter carriers to employ fixed-wing fighters. It even put those plans front-and-center on the world stage in May 2019 when Prime Minister (PM) Abe invited President Trump to visit the second ship in that class during a state visit to Japan. Public and academic discourse has asked if the acquisition of carrier-based fighters reflects the sort of war-making potential that would violate the constitution or a step toward the return of a Japan postured for aggressive action. More likely, the strategic intent is to improve the survivability of Japan's defensive airpower by providing it with the ability to operate out of a greater number of airfields and use the ship as a mobile base capable of avoiding enemy targeting. As the *Izumo*-class ships are typically only outfitted with 28 helicopters, the future complement is expected to be less than a dozen fighters.⁷³

The strategic gains delivered by the carriers will come at great expense to the JMSDF and JASDF which will have to purchase the technology as well as invest in the tactics, techniques, and procedures associated with modern carrier operations. This may be particularly taxing given the current shortfalls in joint interoperability in Japan. However, forcing more joint operations and the common doctrine development may have a useful knock-on effect by further enhancing the overall capability of the SDF. Such a development would be extremely positive given the severe circumstances and resource constraints associated with Japanese defense.

Conclusion

Japanese airpower is evolving in response to maturing threat from neighboring PRC, DPRK, and, to a lesser extent, Russia. As exemplified by the iterations made in the most recent NDPG and MTDP, Japan modernized its fleet of fighters to include fifth generation aircraft and enhanced combat support functions, such as in-flight refueling and C2. Simultaneously, Japan's industrial base and defense technology concerns have impacted Japan's response to these changes. Most recently, Japan's procurement of additional F-35s, including a STOVL variant, and the procurement of defensive strike missiles, illustrate how

contemporary threats are driving Japan to challenge pacifist constraints. Observers of Japanese security strategy issues can expect for this tension and debate over how Japan should address more complex and confrontational PRC and DPRK threats to continue with Japan's airpower capabilities serving as the medium for this discussion, given their strategic role in the defense of Japan.

Notes

- 1 The work reflects the personal research of the authors. It does not represent the position of the U.S. government, U.S. Navy, Virgin Orbit, the Yokosuka Council on Asia-Pacific Studies or any other organization.
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- 48 Ministry of Defense, 2013b, Nikkei, 2017, Kelly, 2019, Waldron, 2019, and Gady, 2019.
- 49 Ministry of Defense, 2013b.
- 50 Ministry of Defense, 2013a.
- 51 Ministry of Defense, 2012.
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8 Southeast Asia

Maria Ortuoste and Zenel Garcia

Air power has long been considered the preserve of great powers. Strategies and doctrines tended to emphasize large air forces and destructive fire power in order to win conventional wars. However, the latest iteration of the “revolution in military affairs,” in addition to the long-term economic growth of many countries have made air power a feasible component of the militaries of small states even if their security objectives are “non-traditional” in nature.

This chapter examines how selected Southeast Asian countries are using these innovative technologies in their air forces. We begin by placing Southeast Asian states’ security concerns within the context of state-building where a strict dichotomy between traditional and non-traditional issues is difficult to sustain. We then discuss how the importance of state legitimacy, in tandem with security concerns, influence air power strategies, spending, and acquisition. The third section assesses how the respective political, economic, and geographical conditions of Singapore, Indonesia, Vietnam, and the Philippines are translated into air power capabilities. We conclude that the complex security environment in Southeast Asia provides a glimpse into the changing nature of air power as technology diffuses and becomes more accessible to these states, thus leading to different interpretations of how air power is developed and applied.

Complex security concerns and state legitimacy

The use of airpower in Southeast Asia reflects the complexity of security concerns that arise from internal and external sources and actors that threaten people’s lives, the economy, and domestic politics (see Table 8.1). Realist theory would classify these concerns as “traditional” and “non-traditional,” implying a hierarchy that ostensibly allows for a clear-cut prioritization where traditional security concerns supersede non-traditional ones. That prioritization, however, is unsuitable to capture the reality of Southeast Asian countries where security concerns manifest in ways that blur the lines between categories. In essence, while it can be argued that every state faces traditional and non-traditional security problems, in the Global South, this neat categorization belies the fact that so-called non-traditional security problems are in fact the everyday lived

experiences of the majority of the world and, thus, a hierarchic understanding of security categories becomes untenable.¹

This is illustrated by a survey of Southeast Asian experts and stakeholders conducted by ISEAS in 2018. They found that, overall, the top three concerns in Southeast Asia were domestic political instability, ethnic and religious tensions, and climate change; interestingly, increased military tensions and terrorism received the lowest scores overall. Countries, of course, differed on their prioritization. Indonesia's top concerns were ethnic and religious tensions followed by domestic political stability. Increased military tensions and climate change were the top two concerns of the Philippines and Vietnam, while Singapore was mainly concerned with climate change.²

These multifaceted concerns are not only problems to be managed, but are also challenges to state legitimacy. Insurgencies and secessionist movements raise questions about the existence of the state itself, while the other issues raise doubts about a state's capability to govern. For example, several Southeast Asian countries, particularly Indonesia, Malaysia, Myanmar, the Philippines, and Thailand, have experienced low to high intensity levels of violence stemming from separatist groups, insurgencies, terrorism, and inter-communal violence in recent years. This has resulted in thousands of deaths and hundreds of thousands displaced throughout the region, thus challenging the state's ability to govern.³

Natural disasters have claimed the lives of 362,000 people, affected 259 more, and cost \$73.2 billion from 2000 to 2016. Climate change will lead to more "area-specific sudden extreme weather events (tsunami, flooding, typhoon and hurricane)" which would lead to further loss of life, property, and infrastructure.⁴ It is estimated that from 2017 to 2030, Southeast Asian countries will incur annual losses between 0.5 percent and 3.2 percent of GDP with the highest costs incurred by countries with very high risk exposure but with very low coping capacity – the Philippines and Cambodia.⁵

Environmental degradation, in particular the loss of coral reefs, is affecting the livelihood of around 104 million people in Indonesia, the Philippines, and Vietnam alone. Dwindling fish stock and increased regional demand have led to illegal, unreported, and unregulated (IUU) fishing, which "has escalated in the past 20 years" with annual catch estimated at "11–26 million tonnes of fish ... for an estimated value of US\$10–23 billion."⁶

Facing poverty, some fishermen have turned to maritime piracy which is still primarily run by criminal elements.⁷ In the early 2000s, most of the world's piracy incidents occurred in Southeast Asia; but coordinated patrols have decreased such incidents in the Straits of Malacca (SoM). If piracy remained unabated, there was a possibility that international trade would have been disrupted. In 2016, around 16 million barrels of crude oil and petroleum products passed through SoM. Together with the Strait of Hormuz, where 18.5 million barrels passed in 2016, they account for the transit of 60 percent of the world's energy resources.⁸ The SoM also play a vital role in world food trade as more than "one-quarter of global soybean exports" pass through these straits "primarily to meet animal feed demand in China and Southeast Asia."⁹

Unfortunately, pirates moved their operations to Indonesian waters and to the Sulu and Sulawesi Seas in the Philippines. These latest attacks were perpetrated by *Abu Sayyaf*, an extremist group, which kidnapped the crew for ransom. If the Philippines had not agreed to Indonesia's demand to improve monitoring and law enforcement, the Philippines would have suffered an energy crisis because around 70 percent of its coal requirements come from East Kalimantan.¹⁰

All these incidents, save for natural disasters, have led many governments to bolster territorial and resource nationalism to gain popular support for military modernization programs. Militarization in the South China Sea (SCS) is a manifestation of these two forces. The primary catalyst is China which has become very aggressive over the past decade, harassing ships, extending its claim up to the Natunas in Indonesia, building artificial islands, and heavily militarizing its occupied features. This situation not only threatens individual countries but also undermines regional relations and the delicate balancing act that Southeast Asian countries had cultivated with their "hedging" strategy. The current situation necessitates a new conflict management approach that is now almost impossible to develop without capitulating to Beijing's demands.

Calibrated responses to a spectrum of security challenges

It can be argued that the most logical choice for Southeast Asian countries is to develop calibrated responses to this broad spectrum of security challenges. The smaller economies of the region cannot sustain large air forces, especially if a country still needs to reduce poverty. Most of the immediate concerns – natural disasters and crimes – do not have conventional military targets. Using precision-guided munitions (PGMs), for example, against civilians like fishermen and criminals, may provoke tensions among neighbors. Many of these security issues – insurgencies, criminal acts – are endogenous and complex which means that solutions should not give rise to more grievances nor create further obstacles to conflict resolution. The bombing of Marawi in 2017, which led to 100 deaths, displaced 98 percent of the city's residents, and destroyed infrastructure, raised serious doubts about the government's sincerity and legitimacy. Even in the SCS situation, Southeast Asian countries still need to be mindful that their top trading partner is China and escalating militarization is not a permanent solution. Table 8.1 lists the air force capabilities relevant for different security concerns.

Non-lethal capabilities are the most useful for many scenarios. Command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) is particularly important for operations that range from surveillance to search-and-rescue (SAR) and even combat.¹¹ The broader "visual and sensor range" of current technology will enable "comprehensive awareness."¹² Unmanned aerial vehicles (UAVs) and unmanned combat aerial vehicles (UCAVs) can also be used for long-term surveillance and "near real-time kinetic response" as well as for "dangerous" missions such as probing enemy defences.¹³ Airlift capabilities are, likewise useful for SAR and humanitarian

Table 8.1 Security challenges in Southeast Asia

<i>Sources/actors</i>	<i>Threats to ...</i>	<i>Frequency/urgency/time horizon</i>	<i>Relevant air power capabilities</i>
Natural environment	Earthquakes Volcanic eruptions Tsunamis Climate change Shipping accidents Insurgents and terrorists	People's lives Domestic economy Environment, economy, international trade	C4ISR Air lift
Non-state actors	Criminal elements: poaching, smuggling, drug trafficking	People's lives State sovereignty Political stability Domestic and local economy Other states (in the case of IS-inspired actors) State sovereignty Political control Domestic economy; corruption Maritime zone protection Environmental degradation People's lives	C4ISR Air lift Lethal (occasionally)
	Criminal elements: piracy	Everyday	C4ISR Interdiction
State-supported (in whole or in part)	Fishing industry: IUU fishing	Everyday although major piracy incidents are not as common Everyday	C4ISR Interdiction C4ISR
	Oil explorations	Everyday although states have agreements on joint explorations, among others	C4ISR
State actors	Territorial and maritime disputes; arrests, minor skirmishes	Arrests – can be everyday New claims – intermittent Fortifications/assertion of claims – everyday	C4ISR Interdiction
	Great powers: U.S., China, Russia, India	Every day (presence and occupation) Intermittent	C4ISR Interdiction Lethal

assistance and disaster response (HADR) operations which are expected to increase as climate change worsens.

Another possible scenario is one where “[l]ethal forces support the operation by providing security within which the main operation can take place.”¹⁴ For example, delivering humanitarian assistance in conflict areas might require protection against potential hostile actors. In SAR and HADR operations, the “air mobility mission (the application of airlift and air mobility forces), in and of itself directly serves the national security objective” but “it is not an enhancer, but rather a direct application of nonlethal airpower.”¹⁵

Finally, lethal military force is the main means to achieve national security objectives. In this traditional case, “[m]ost roles for airpower are related to their ability to control, apply, or multiply combat force” or as a “force enhancer” and “non-lethal forces support the operation through initial deployment and sustainment to allow the combat forces to achieve the primary objective.”¹⁶

Military modernization

Military modernization programs in Southeast Asia began in the 1990s when the Cold War’s end ushered in an uncertain environment. At that time, programs focused on replacing outdated equipment; by around 2005, most modernization programs sought upgrades and acquiring the most recent technology.

Military spending in Southeast Asia primarily reflects economic fluctuations, the most important of which were the 1998 Asian financial crisis and the 2008 global recession. Economic recovery, however, seems to have re-energized most programs. From 2010 to 2017, Indonesia had the highest percentage change in spending at 87 percent, followed by the Philippines (58 percent), Vietnam (49.5 percent), and Thailand (28.7 percent). In terms of per capita spending, Vietnam registered the highest percentage change at 62.5 percent, followed by Indonesia (52.6 percent) and the Philippines (45 percent). Singapore has consistently outspent other Southeast Asian countries in real terms (\$10 billion in 2017), as a percentage of GDP (3.3 percent in 2017), and as a share of government spending (16 percent in 2015).

In terms of imports, Asia/Oceania is the “main recipient region, accounting for 42 per cent of the total global volume of imports of major weapons in 2013–16.”¹⁷ It is significant that one of the top 10 importers for major weapons from 2013 to 2017 is Indonesia whose imports accounted for 2.8 percent of global arms imports. Although air forces still get the smallest share of defense expenditures in Southeast Asia, spending on aircraft, air defense systems, missiles, and sensors as a share of imports has increased.¹⁸

There is robust spending on aircraft – they were almost 40 percent of Indonesia’s imports, 78 percent of Singapore’s, more than 30 percent of Thailand’s, and 25 percent of Vietnam’s in 2016. Aircraft comprised 100 percent of Philippines’ imports in 2014 and 53 percent in 2017. Multi-role aircraft are also being purchased to complement existing fighter aircraft and combat

helicopters. For example, the H225M, a multi-role helicopter, is currently operational in Malaysia, Indonesia, and Thailand, and was recently ordered by Singapore.¹⁹

All countries are also purchasing PGMs such as multiple launch rocket systems, GPS-guided missiles, and joint direct attack munitions (JDAM) that transform unguided bombs into all-weather PGMs. These are cheaper than fighter aircraft and some analysts predict that “these technologies will complement or eventually replace fighter aircraft for short-range strike missions (<100nm).”²⁰ Air defence systems comprised 20 percent of Indonesia’s imports in 2015 and 13 percent of Singapore’s, Thailand’s, and Vietnam’s between 2016 and 2017. In terms of missiles, they were 40 percent of Singapore’s imports in 2015 and 2017 and less than 15 percent for the rest of Southeast Asia. This reveals a pattern of increased missile defense as well as increased missile strike capabilities throughout the region.

The most recent trend in acquisition has been the purchase of UAVs. For example, UMS Skeldar, a Swedish aerospace company, identified the Asia-Pacific as one of its priority regions for business growth and it already has contracts with Singapore and Indonesia.²¹ Singapore, Indonesia, the Philippines, and Thailand have received UAVs, and Indonesia placed an order in 2017 for a UCAV (Wing Loong-1) from China. The seven countries have also been purchasing upgrades for existing, or new, sonars, radars, and aircraft electro-optical systems for C4ISR.

Yet to be effective, this new technology need to be integrated into “a unified command chain,”²² which would entail changes in military organizations as well as in their strategies and doctrines.²³ Having a strong domestic defense industry will also be necessary for the upkeep of equipment. In Southeast Asia, Indonesia and Singapore are considered second tier small arms producing states capable of assembling aircraft in their countries. For example, Indonesia’s H225m helicopters were customized by PT Dirgantara Indonesia (PTDI) for “combat search and rescue-capable fleet.”²⁴

To better understand the diversity of approaches and capabilities in Southeast Asia, this chapter looks at Singapore, Indonesia, Vietnam, and the Philippines. These countries were selected due to their various levels of air power development and integration as well as the diversity of security challenges they face. For example, while Singapore possesses the most capable air force in the region, the Philippines is only now acquiring modern aircraft. Additionally, while the security challenges faced by these four countries intersect traditional and non-traditional categories, they each experience these to varying degrees. Indonesia and the Philippines face several domestic insurgent groups, while Singapore and Vietnam do not. At the same time, as archipelagic states, Indonesia and the Philippines encounter environmental security issues in ways that Singapore and Vietnam do not. In other words, these four case studies provide a fertile ground to assess the role and application of air power across a diverse set of countries in the region in the context of their evolving security needs.

Singapore's total defense

Survival and vulnerability are key factors in the modernization of the Singapore Armed Forces (SAF), which includes the Royal Singapore Air Force (RSAF). Its leaders are aware of the country's vulnerabilities in terms of land size, lack of strategic depth, limited personnel, as well as its dependence on external trade. Thus, Singapore's defense policy has consistently been based on two pillars – deterrence which requires a “professional and capable” military, and diplomacy to ensure a stable regional environment. The operationalization of these two pillars has evolved over the years to reflect the gradual modernization of its military.

Deterrence

Singapore inarguably has the most capable military in the subregion having consistently outspent its neighbors dedicating, at times, more than 5 percent of its GDP to defense spending and between 3.5 and 4.5 percent of its GDP over the last two decades. The first iteration of its deterrence strategy was called, unofficially, the “poisoned shrimp” strategy, i.e., Singapore's defeat would come at a significant cost for any invader. This defeatist strategy, however, was soon replaced by a “porcupine” strategy which posited that Singapore will be capable of “hitting back” at an enemy and surviving. By the mid-1980s, the government adopted the strategy of “Total Defense” which continues up to the current time. Its defense white paper, *Defending Singapore in the 21st Century* (2015), identifies security threats in a comprehensive manner which augurs with Total Defense's “five mutually reinforcing dimensions – military, civil, economic, social, and psychological security.”²⁵

Because of its geographic and personnel limitations, Singapore considers technological advances as a force multiplier. It is currently building a “third generation” air force which can provide “continuous air surveillance and early warning of air threats” and which would provide a “multi-layered air defence umbrella [employing] air defence fighter aircraft, surface-to-air missiles and anti-aircraft guns. In battle, the RSAF's objective is to achieve air superiority quickly and dominate our skies.”²⁶

Singapore has largely succeeded in this effort. It has four Gulfstream G550 business jets “outfitted with IAI's EL/W-2085 Conformal Airborne Early Warning L-band/S-band radars.”²⁷ It was also the first in the region to obtain Elbit Systems' Hermes 450s and, later, Heron 1 MALE UAVs. The latter can be deployed with fighter aircraft and has the capability of targeting multiple targets.²⁸ The RSAF also has seven squadrons of multi-role fighter aircraft (F-15s and F-16s), logistics and transport aircraft and helicopters, ground-based radars, as well PGMs deployed in the air and on the ground. The RSAF recently acquired the A330 multi-role tanker transport and it has announced plans to acquire F-35Bs which would enhance Singapore's capability for pre-emptive strikes.

These are all part of the armed forces' efforts to develop a “dolphin” defense strategy where the three branches are networked “leveraging ... precision firepower,

maneuvers and superior information.”²⁹ Thus, Singapore’s 2015 defense white paper emphasizes an “integrated fighting force” where the three services are part of a “total system” that will yield operational combat results that are beyond the size of the SAF.

Diplomacy

These acquisitions also aid Singapore’s second pillar – diplomacy, in particular multilateral operations. In Afghanistan, the RSAF used drones to surveil roads and identify IEDs in support of ground forces and in 2011, it deployed two Super Puma helicopters for counter-piracy operations in the Gulf of Aden.³⁰ The RSAF also contributed to HADR operations – in 2005, it sent four CH-47 Chinook helicopters to New Orleans, Louisiana; in 2011, it sent C-130 transport aircraft and KC-135 air refueling tankers to New Zealand after its earthquake; in 2014, it aided in the search for Malaysian Airlines flight MH370; and in 2018, it sent two C-130 transport aircraft plus crew to deliver relief packages to Indonesians after the earthquake and tsunami. Apart from the joint Malacca patrols, Singapore is also taking the lead in developing coordinated responses to disasters through the Changi Regional HADR Coordination Centre and its support for the establishment of an AHA Centre in Jakarta. Its new A330 multi-role tanker transport (MRTT) will not only enhance RSAF’s contributions in SAR and HADR operations, but it will also increase the operational range of fighter aircraft because the MRTT has strong refueling capabilities.³¹

These deployments not only help Singapore realize its objective of regional stability, but they also raise the clout of Singapore as a responsible international actor and provide its personnel with more field experience than it otherwise would have.

Sustaining the momentum

There are several reasons why Singapore’s military modernization will continue. First, Singapore’s economy is expected to grow at around 2 percent until 2030 which would enable the continuation of SAF modernization.

Second, Singapore has a strong defense industry and it has carved “a strong niche in aircraft upgrade packages” and is an aerospace contractor for Airbus Boeing and Eurocopter.³² By 2017, SIPRI included Singapore’s *ST Engineering* in its list of the top 100 arms-producing companies in the world. Further, Singapore is a “security cooperation participant outside of the F-35 cooperative development partnership,” and its Defence Science and Technology Agency (DSTA) has started collaboration with Airbus on developing 3-D printing of spare parts for the fleet of A330 MRTT aircraft.³³

Third, its military leadership seems stable despite some current political troubles that the People’s Action Party has faced. Yet, this organizational culture might itself be a problem. Military effectiveness requires institutions that are “agile” in order to fully incorporate the new technology; yet, Singapore’s defense institution

has been described as “administrative, technocratic, and cost-effective defence management.” It is an “adaptive ‘systems-integrator’ rather than a ‘disruptive innovator’.”³⁴ RSAF has a UAV Command but this also needs to be better integrated with the other branches of the military.³⁵

The lack of personnel is a bigger problem in the future as birth rates continue to decline in Singapore. To compensate, the government focuses on quality training not only at home but also abroad. The RSAF has overseas detachments in the U.S., South Africa, France, India, and Australia for the purpose of training its air force and participating in joint military exercises. In the end, Singapore is perhaps the only Southeast Asian country that has air power capabilities that fulfill a range of operations from monitoring of its sea lanes to SAR and HADR to possible combat extending beyond its own airspace.

Vietnam’s anti-access/area denial strategy

Perhaps more than any other Southeast Asian country, Vietnam’s understanding of air power is influenced by traditional security issues, particularly the South China Sea (SCS) disputes. While its last defense white paper (2009) is explicit about the intersection of traditional and non-traditional security issues in the region,³⁶ it is clear that its military modernization drive and the exponential growth in defense spending reflects increasing tensions in the SCS.³⁷ Its recent acquisitions of defense platforms will enhance Vietnam’s air power capabilities to counter China’s growing footprint in contested spaces. In essence, Vietnam is developing an anti-access/area denial strategy in order to address the asymmetric nature of the Sino-Vietnamese dyad.³⁸

Access and denial capabilities

After a period of disrepair, particularly when foreign aid stopped following the USSR’s collapse, Vietnam embarked on a military modernization program in the mid-1990s. This modernization was galvanized by growing Sino-Vietnamese tensions in the SCS in the late 1980s and early 1990s.³⁹ While the Navy has been the greatest beneficiary of the military modernization program, followed by the Air Force, the platforms acquired by the former over the past decade clearly improve Vietnam’s air power capability. This reflects Hanoi’s understanding of air power as multidimensional, i.e., air power can emanate from the Air Force, the Navy, and Army.⁴⁰

From 1994 to 1998, the Vietnamese Air Force acquired 12 Russian Su-27 fighters (SIPRI), expanded its fleet of Su-22 bombers, and modernized its existing stock of Su-22s in order to mount anti-ship missiles and extend their service life.⁴¹ Additionally, Vietnam acquired 36 Su-30s between 2003 and 2016, giving it one of the most capable and modern air wings in the region. Vietnam also upgraded its Su-27s and Su-30s to carry advanced air-to-surface and anti-ship missiles such as the Kh-59M and Kh-31 respectively.⁴² In fact, the Su-30 variant that Vietnam acquired and upgraded – the MK2V – is considered the most

modern in Asia. This includes Chinese, Indonesian, and Malaysian fleets of Su-30s.⁴³ As such, the only fourth generation fighter in the region that supercedes the MK2V are the Su-35s deployed by China and Indonesia, and the F-15 fighters deployed by Singapore.

Vietnam's naval modernization also facilitated its development of air power. Naval modernization started with the acquisition of four Tarantul-class corvettes between 1994 and 1998.⁴⁴ Equipped with a complement of anti-ship and surface-to-air missiles, these corvettes were the first capable surface combatants in the Vietnamese Navy.⁴⁵ Vietnam's naval modernization picked up pace in the mid-2000s as it acquired eight Molniya-class corvettes⁴⁶ equipped with a more advanced assortment of anti-ship missiles than the Tarantul-class vessels. By 2006, Vietnam began acquiring its largest and most advanced surface combatant to date, the Gepard-class frigate. The first two ships in the class were configured for surface attack and commissioned in 2011, while another two ships were configured for anti-submarine warfare and commissioned by 2017.⁴⁷

Vietnam's most important naval acquisitions are its six Kilo-class submarines commissioned between 2014 and 2017. Not only does this mean that Vietnam has the most advanced submarine fleet in the region, but its armament of anti-ship and land-attack missiles enhances the country's air power capabilities.⁴⁸ In essence, Vietnam has a silent platform from which it can target surface vessels as well as land targets. Short of operating stealth bombers and fighters, these are the most effective air power multiplier platforms in the Vietnamese arsenal.

These naval acquisitions fit into Vietnam's attempts to close the gap between its and China's material capabilities. By obtaining missile platforms such as corvettes, frigates, and submarines, Vietnam has not only enhanced its air power capabilities, but it has also developed its own anti-access/area denial capability against China.⁴⁹

Lastly, Vietnam has incorporated three key air and coastal defense systems into its arsenal. First, it acquired two batteries of the S-300PMU-1 surface-to-air missile system between 2003 and 2005.⁵⁰ This Russian-made platform is considered one of the most effective all-altitude regional air defense systems in the world.⁵¹ To complement these batteries, Vietnam purchased five batteries of the Israeli SPYDER short and mid-range air defense system in 2015.⁵² This platform allows Vietnam to cover a spectrum of short, mid, and long-range air defense, thus providing several layers of protection to key areas in the country like Hanoi.⁵³ Vietnam also acquired two batteries of the K-300P Bastion-P coastal defense missile system between 2009 and 2011.⁵⁴ This platform can engage surface ships, carrier battle groups, and even landing craft, making them perfectly suited for a contingency in the SCS. Considering that Vietnam's entire coastline faces the SCS and that the platform has a range of 300 km, most of China's features in the area will be within range.⁵⁵

Technology transfers

Like Indonesia and Singapore, military technology transfers have allowed Vietnam to develop a domestic military industrial complex albeit to a more

limited extent than its more developed neighbors. Nevertheless, Hanoi has secured access to some crucial military technology that directly affects the development of its air power capability. For example, in 2004, Vietnam secured a license from Russia to build the Molniya-class corvettes domestically, thus resulting in shipbuilding technological transfers. Out of the eight corvettes acquired so far, six of these were built domestically.⁵⁶ More importantly, in 2016 Russia and Vietnam signed a license agreement for domestic production of three variants of the Kh-35 anti-ship missile. Considering that the Gepard-class frigates and Molniya-Class corvettes are equipped with this missile, this represents an important capacity-building breakthrough for Vietnam and gives it the opportunity to utilize the missile in several platforms.⁵⁷

These developments build on long-standing Russo-Vietnamese missile technology transfers, exemplified by the 2002 agreement which allowed Vietnam to produce the SA-18 low-altitude surface-to-air missile, and the 2006 agreement to transfer technology for the local production of the SS-N-26 ship-to-ship missile.⁵⁸ As a result, Vietnam has developed the domestic capacity to produce, maintain, and repair existing stocks of naval and air weapons platforms that are crucial for its anti-access/area denial strategy.

Indonesia as the global maritime fulcrum

Air power has become increasingly important in Indonesian strategic thinking. While naval modernization and procurement take up the bulk of recent expenditures, the development of air power through the Air Force and the Navy indicates that the establishment is aware of the complementarity of those two branches in the context of the state's security needs. In other words, air power is not only the wheelhouse of the Air Force but also the Navy. Additionally, they understand that air power goes beyond the procurement of modern fighter jets, but also airlift, radars, satellites, drones, and missile capabilities.

Indonesian air power developed as a natural extension of its maritime identity which was first conceptualized in the 1950s. Then vice president Mohammed Hatta introduced the "two oceans and two continents" doctrine in 1953, alluding to Indonesia's central position between the Indian and Pacific Oceans and the Asian and Australian continents.⁵⁹ Under this doctrine, Indonesia can be a facilitator for communication and commerce between these spaces, thus making it a pivotal actor in the international stage.⁶⁰ While the doctrine fell into disuse during Suharto's tenure, it began to see a revival under the administration of Susilo Bambang Yudhoyono who, at the 2012 Shangri La Dialogue in Singapore, discussed the increasing interconnection between the Indian and Pacific Oceans, potential geopolitical rivalries, and Indonesia's role in managing these developments.⁶¹

Joko Widodo's presidency saw the full revival of the "two oceans and two continents doctrine." In 2014, Widodo announced the "Global Maritime Fulcrum" policy which highlights Indonesia's pivotal geopolitical position as the gateway between two oceans and two continents.⁶² By recognizing the opportunities and challenges posed by Indonesia's archipelagic nature and

global position, Widodo's Global Maritime Fulcrum integrates the maritime and air domains.⁶³

This inter-domain synergy was made more explicit in the 2015 Indonesian Defense White Paper. First, it stated that air and maritime domains must be integrated in order to realize the vision of the Global Maritime Fulcrum policy. Second, air power not only involves the acquisition of modern fighter aircraft, but also the capability that allows the exercise and projection of air power. In this sense, radars, satellites, drones, airlift, and missile capabilities become crucial. Lastly, there is an explicit recognition of the intersection of traditional and non-traditional security threats thus making the aforementioned capabilities increasingly important. In fact, the White Paper is clear that although traditional issues require continued attention, it is non-traditional security challenges that are the most pressing for the Indonesian military.⁶⁴

Military modernization

This vision notwithstanding, the Indonesian government is cognizant of its material limitations and the need to maintain a careful balance between increased defense spending and maintaining economic stability. Thus, Indonesian leaders want weapons acquisitions and purchases to run efficiently in order to meet the basic security needs of the country. This is enshrined in the Minimum Essential Force (MEF) modernization program which targets specific platforms that either need to be upgraded or acquired from 2007 to 2024.

In the realm of traditional air power, the Indonesian Air force aims to acquire a larger fleet of modern fighter jets by expanding the current fighter squadrons from six to eight by 2024. Since each squadron will operate at least 16 fighter jets, dozens of outdated third generation, or older, fighters need to be replaced.⁶⁵ Since only half of the current six squadrons are made up of fourth-generation fighters, Indonesia's Air Force will need greater funding to meet its short-term goal.

There are, however, positive signs that Indonesia has been making headway. Indonesia ordered 11 Su-35 multi-role fighters from Russia in 2018, adding to its existing family of Sukhoi fighters.⁶⁶ The Su-35 is equipped with several fifth-generation technologies which will make it the most advanced fighter in the Indonesian Air Force and also the most capable fourth-generation aircraft in the world.⁶⁷ An increasingly modern fighter arsenal will allow Indonesia to patrol the airspace over its vast archipelago, particularly its Archipelagic Sea Lanes (ASLs), the airspaces of which have been increasingly violated by foreign civilian and military aircraft.⁶⁸

Although acquisitions of top-tier fighters generate more attention, the Indonesian military has been acquiring platforms that help address the complex security environment identified in its White Paper. In order to combat insurgent and terrorist groups, the Indonesian Air Force acquired 16 Embraer EMB 314 Super Tucano light attack aircraft (SIPRI). The Super Tucano is considered as one of the leading platforms for border patrol and counterinsurgency operations due to its ability to utilize rugged airfields and operate under hostile insurgent fire (EMB-314 Super Tucano).

Additionally, Indonesia is upgrading a batch of 15 T-50 advanced jet trainers/light attack jets acquired from South Korea which will improve its gun and radar systems.⁶⁹ This upgrade would allow the T-50 to perform training and combat operations, thus making it a suitable platform for ASL policing.

The Indonesian Air Force also plans to expand its airlift capabilities. Inadequate responses to recent environmental and humanitarian crises, like the 2018 Lombok earthquake, have demonstrated that the Indonesian Air Force is ill-equipped to respond quickly to remote areas of the archipelago and to deliver much-needed supplies. As a result, it has had to rely on the airlift capability of other countries during crises.⁷⁰ Additionally, while Indonesia has acquired some modern light and medium capacity transport planes in recent years, the bulk of its airlift remains antiquated and prone to crashes. Because the Air Force has lost five C-130B/H Hercules transport aircraft, Jakarta has begun plans to update its existing six transport squadrons by 2024.⁷¹ In 2018, Indonesian Defense Minister Ryamizard Ryacudu said that the Air Force will acquire new C-130J Super Hercules transport aircraft and CH-47 Chinook heavy-lift helicopters to address the challenges an archipelagic country faces in providing crucial HADR functions in the event of a crisis.⁷²

As an auxiliary to upgrading its airlift capabilities, the Indonesian Air Force procured six Airbus H225M helicopters and placed an order for eight more in 2019.⁷³ The H225M can conduct combat SAR operations, a task that is particularly important in a country composed of over 17,000 islands. To aid in maritime patrol, the Indonesian government has partnered with *Contrucciones Aeronauticas SA (CASA)* to produce several aircraft variants including the CN-212 light transport, the CN-235 maritime patrol aircraft, and the CN-295 medium transport.⁷⁴ The CN-235 is capable of conducting SAR operations, exclusive economic zone (EEZ) control, marine pollution prevention and control, as well as maritime surveillance and security missions.⁷⁵ Furthermore, it is able to conduct anti-surface warfare (ASuW) and anti-submarine warfare (ASW) operations depending on the armament configuration employed.⁷⁶

Technology transfers

Indonesia's geographic position and its emerging role as a regional power accord it a number of benefits that other countries in the region, barring Singapore, may not enjoy. The most important benefit is the increasing willingness of major arms producers to transfer technology that will help Indonesia develop its military industrial complex. For example, Indonesia partnered with Airbus to produce H225M helicopters, as well as with CASA to produce the CN-212, CN-235, and CN-295 line of aircraft.⁷⁷ In fact, Indonesia has become an exporter of its variations of the CN aircraft family, thus facilitating the development of its military industrial complex and its capacity to locally develop air power capabilities (PT Dirgantara Indonesia). An example of this is the proposed gunship variant of the CN-235 line that can be utilized in counterinsurgency operations.⁷⁸ Indonesia has also expanded its cooperation from European countries to regional

ones. It acquired technology transfers from South Korea in the naval and aerospace sector.⁷⁹ Additionally, in 2015 Indonesia and Japan signed an agreement in which Japan pledged not only to export weapons to Indonesia, but to also transfer weapons technology. This was a watershed moment in their bilateral relations particularly since Japan was relaxing its arms controls and Indonesia was the first country in Southeast Asian to which it made this offer.⁸⁰

This process is expected to continue as the Indonesian economy continues to grow as a result of “solid macroeconomic management and strong domestic demand.”⁸¹ In fact, Indonesia is the 16th largest economy in the world in nominal terms and the 8th in power purchase parity terms in the world.⁸²

Philippines’ “flight plan”

The Philippines has every incentive to develop its air force capabilities – its navy is literally face-to-face with Chinese ships in the SCS, the country is at most risk for natural disasters, IUU fishing and smuggling are constant worries, the communist insurgency and demands for autonomy remain, and piracy with kidnapping have increased in the Sulu and Sulawesi Seas. While its current capabilities are not commensurate to security issues challenges across and beyond the archipelago, there has been concrete progress with new acquisitions. Staying on that path, however, will depend on overcoming political, economic, and organizational problems.

Modernization in stops and starts

Plans to modernize the Armed Forces of the Philippines (AFP) have been in place since 1992, when the Philippine Senate abrogated its Military Bases Agreement with the U.S., up to the current time with the implementation of the Second Horizon phase of the 2012 revised AFP Modernization Act. Yet the past 27 years only saw a modest improvement in naval and air power capabilities which ratcheted up only by 2010. Modernization plans, of course, need to respond to changing security environments, but there are four nagging problems that the Philippines has yet to overcome.

The first is economic. The original AFP modernization plans (1995) to buy multi-purpose fighter plans were scuttled when the Philippine peso depreciated in value by 40 percent during the 1997/1998 Asian financial crisis. The 2008 global recession similarly led to weaker economic growth but, since then, the Philippine economy is growing slowly enough to fund more purchases.

Corruption, however, undermines the efficient use of limited financial resources. Transparency International’s 2015 *Government Defence Anti-Corruption Index* placed the Philippines at high risk of corruption with the most problematic area being personnel.⁸³ And while there is a process for acquisition planning, “there is only limited evidence of clear oversight and public information.” In fact, initial attempts to produce UAVs domestically was stopped in the early 2000s due to corruption.⁸⁴

But the two most important reasons are the shifting political priorities of Philippine presidents and the path dependence of Philippine–U.S. institutional arrangements. The prioritization of security concerns and, concomitantly, which branches of the AFP to modernize, have differed from one president to the other. Former presidents Fidel V. Ramos and Benigno Aquino III pushed for improving military capabilities for external defense particularly in the maritime zones; while Joseph Estrada, Gloria Macapagal-Arroyo, and Rodrigo Duterte preferred to focus internally on a war with the secessionists in Mindanao, counter-terrorism and a war on drugs, respectively. What makes Duterte stand out is his particularly hostile attitude towards the U.S. which made relations tense between the two executives, but did not really stop institutional and on-the-ground arrangements between the militaries of the two countries. In fact, the U.S. has even helped in combat operations. In 2012, the U.S. used “targeted drone strikes” against the Abu Sayyaf Group “marking the first time a drone was used in Southeast Asia for a targeted killing operation.”⁸⁵ And in 2017, Philippine officials have stated that 107 American soldiers were conducting surveillance operations via aircraft and UAVs over Mindanao during the siege of Marawi. This institutional relationship between the two countries, established since the end of World War II, is so deep and broad that breaking those bonds requires not only an inordinate amount of financial investment but also the political will and strength to oppose the country’s military leadership. Even the popular Duterte could not break that bond.

Acquisitions and capabilities

Changes in priorities dampened, but did not fully obliterate, modernization plans. The *Defence Reform Program* of 2005, which superseded the original plan under Ramos, focused on developing internal security capabilities. The key purchases were 20 refurbished UH-1H helicopters from Singapore as well as a second-hand Fokker F-27 Fellowship transport aircraft. The development of air force capabilities was limited to extending the service life of existing plans. This was in line with counter-terrorist operations supported by the U.S. in its global war on terror.

The most dramatic increase in capabilities occurred under Aquino III’s administration. The first phase of the *Revised AFP Modernization Program*, from 2013 to 2017, concluded with the acquisition of two multi-purpose helicopters, refurbished UH-1Hs, combat utility helicopters, an attack helicopter, medium-lift aircraft, and two Lockheed Martin C-130T turboprop freighters “configured for in-flight refuelling.”⁸⁶ The most significant acquisitions are 12 FA-50 fighter jets. While they are not necessarily for deployment to Pag-Asa island in the SCS, they serve as a bridging platform for multi-role fighters and can be used for counterinsurgency operations (as it has enhanced bombing accuracy) and high-speed reconnaissance. In 2017, 51.8 percent of imports were aircraft, with the U.S. providing two new Cessna 206B reconnaissance aircraft which were deployed to Marawi City at the height of military operations in 2017.⁸⁷ To improve domain awareness, the Philippines bought sensors which comprised 66.5 percent of its imports in 2016 and 31.7 percent of its imports in 2017. UAVs were purchased from Sweden,

France, Israel, and the U.S. It is notable, however, that many of the above-mentioned imports were second-hand, and most imports came from the U.S. under its Foreign Military Financing program.

By 2018, the Philippines' defense department announced that they would recapitalize equipment with a total budget of \$5.6 billion over five years. In this *Horizon 2 Modernization Program*, the air force will get \$2.61 billion followed by the navy (\$1.44 billion) and the army (\$890 million). They hope to obtain more multi-role fighters, airlifters, maritime patrol aircraft, and heavy lift helicopters.⁸⁸ Despite Duterte's previous threat to stop modernization and cut all ties with the U.S., he eventually gave in partly due to the need for AFP support as the 2019 elections were looming, and due to the continuing distrust of the Philippine public of China. This was made more acute when AFP Chief of Staff Gen. Carlito Galvez Jr. admitted that China would issue aggressive radio warnings to Philippine military aircraft on a daily basis.⁸⁹

All of these acquisitions are in line with the Philippine Air Force's (PAF) *Flight Plan 2028* the goal of which is to develop the "capability to detect, identify, intercept and neutralize intrusions in the Philippine Air Defence Identification Zone (PADIZ) and West Philippine Sea from Area Readiness 4 to 3 by 2022 and in the entire Philippines from Area Readiness 3 to 1 by 2028."⁹⁰ The *Flight Plan*'s first phase, "Support Process," is being implemented with the acquisition of the FA-50s and helicopters. It is expected that the PAF will be acquiring "a short- and medium-range SAM system, a ground based radar installation/s, early warning and control aircraft" and possibly more FA-50s.⁹¹ The *Flight Plan*'s second phase, "Core Process," includes restructuring the PAF into an integrated command, training for mission-essential tasks, and further acquisitions plus research and development. Former PAF chief Lt. Gen. Galileo Gerard Kintanar stated that they will develop a robust C4I system which would include coordinating with "the Department of Transportation (DOTr) and Civil Aviation Authority of the Philippines to integrate their air defence radars."⁹²

These are positive developments but, again, there are signs that there may be some roadblocks along the way. The country's economic growth is still fueled by income remittances from overseas Filipinos. "In 2016, these inward remittances reached nearly US\$27 billion, the highest amount on record."⁹³ While Duterte's infrastructure project might help generate economic growth, the Philippines' rank in "the World Bank's Ease of Doing Business survey fell from 99 in 2016 to 113 in 2017."⁹⁴ The Philippines does not have a strong manufacturing base "with companies mostly restricting themselves to small arms, mortars, and ammunition, plus items such as tactical radios." The state-owned Philippine Aerospace Defence Company has been providing aircraft maintenance but this is still a far cry from the level of Indonesia's capabilities.⁹⁵ Corruption and organizational problems continue. In 2018, Duterte suddenly replaced PAF Chief Kintanar over alleged disagreements over equipment purchases. Finally, the possible election of more pro-Duterte politicians in 2019 makes it more likely that there will be sweeping constitutional changes. While there are no signs that the military will be disbanded, this serious political issue will certainly have a negative impact on military modernization plans.

Conclusion

These case studies reveal the complex nature of the development and acquisition of air power in Southeast Asia. Specifically, they demonstrate how air power is no longer the wheelhouse of major powers to be used solely for the purpose of obtaining air superiority and air control. Two important dynamics emerge from these cases. The first is that air power is relevant even for states with modest or minimal means. This means that middle and small powers can contribute to the development of air power doctrines as technology diffuses and becomes more globally accessible.

The second is that while traditional security challenges remain a powerful motivator for acquiring air power capabilities, in Southeast Asia non-traditional security challenges have been key drivers of how doctrines were developed and, consequently, what types of platforms are acquired. This is especially the case in archipelagic states like Indonesia and the Philippines where SAR and HADR capabilities are crucial for the proper exercise of state power. Additionally, the fact that countries like Indonesia and the Philippines are coping with domestic insurgent groups, criminal activities in their maritime domains, as well as the fact that Vietnam aims to establish an Anti-Access/Anti-Denial (A2/AD) strategy to address the asymmetrical challenge posed by China in the SCS, means that air power does not solely emanate from the acquisition and deployment of air superiority fighter aircraft. In these domains, patrol and surveillance aircraft, light attack planes, drones, and ground and naval-based missile platforms are essential for the proper exercise of air power.

From these two dynamics an important conclusion emerges: the nature of air power is a sum of all its parts. It does not reside purely within the air branches of the military, nor does it reside specifically in fighter and bomber platforms. Air power is diffused along all of the service branches and is composed of several land, air, and sea-based systems that work together to address the security needs of the state and its citizens. In this sense, air power is as much the fighter jet that can defend the state's airspace, as much as it is the cargo plane that provides much-needed supplies to citizens affected by natural disasters.

Notes

- 1 Acharya, 1995.
- 2 ASEAN Studies Centre, 2019.
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9 New Zealand¹

Carol Abraham

Military airpower in New Zealand has waxed and waned over more than a century. The earliest efforts saw civilian enthusiasts provide pilots for the British Royal Flying Corps in 1915, leading to the eventual formation of an independent Royal New Zealand Air Force (RNZAF) in 1937. The peak of combat airpower was seen in extensive operations in the Pacific during World War II. Airpower was used in most of the conflicts New Zealand participated in during the twentieth century but waned in the face of post-Cold War strategic settings and other national priorities. Although a series of mid-life upgrades kept remaining airpower capabilities relevant, a full renewal is now necessary. Regeneration began with the introduction of medium mobility helicopters and continues under a new *Defence Capability Plan 2019* (DCP 2019), underpinned by a government policy reset in 2018. The Royal New Zealand Air Force is itself evolving as part of an increasingly integrated New Zealand Defence Force (NZDF). The NZDF is structuring to project and sustain forces in response to crises in New Zealand and the Pacific, as well as providing credible and interoperable contributions to combined global security operations. Contemporary airpower in New Zealand is now focused on military roles of Air Mobility, Airborne Surveillance and Response, and Naval Combat Aviation. Light civilian air capabilities are also routinely augmented by NZDF airpower for more complex operations.

The breadth of roles and tasks expected of this small airpower force in support of a comprehensive approach to national security is extensive. Challenges include interoperability, affordability, multi-role requirements, capacity for concurrent operations, and how to maintain latent scalability. Adapting to a more uncertain strategic environment and information age technology will exacerbate these challenges.

New Zealand strategic context

New Zealand's geographic position on the outer edges of the broad Indian Ocean and Western Pacific region belies its level of interconnectedness with the region. Despite being geographically distant from most of the powers described in this volume, New Zealand is intrinsically connected through diplomatic and strategic partnerships, economic interdependency, people migration, and increasing

demographic diversity. New Zealand's strategic self-image is a nation "in and of" the South West Pacific, closely linked to Australia through open travel for citizens and open trade systems, and conceptually part of Asia-Pacific.² Four pillars of security and prosperity outlined by the Ministry of Foreign Affairs and Trade in 2018 were: "supporting a rules-based international system; participating in international and regional bodies; leveraging a network of strong bilateral relationships; and building a diverse portfolio of export markets."³

Strategically, Australia is New Zealand's only formal defense ally.⁴ Economically, the two countries' economies are deeply connected and enjoy high mobility of citizens. Other close security relationships remain with the traditional partners of the twentieth century, reflecting strong historical linkages in defense and security arrangements with the UK and US, and enduring relevance of the Five Eyes intelligence system.⁵ Some twentieth century regional security arrangements such as the Five Power Defense Arrangements (FPDA) underpin defense relationships with countries such as Singapore and Malaysia, at the same time as wider regional forums gain prominence; for example the ASEAN Defence Ministers Meeting (ADMM+).⁶ Contemporary relationships with the US are reflected in the Wellington Declaration of 2010 and Washington Declaration of 2012, moving the relationship beyond differences in nuclear policy.⁷ Nevertheless, a long-standing independent foreign policy culture remains evident in New Zealand contemporary practice.⁸ Economically and socially New Zealand is interdependent with a much broader range of global trading partners and rules-based international operating frameworks, particularly in Asia and the South Pacific. The Pacific Islands Forum and frameworks such as the 2000 "Biketawa" declaration or more recent "Boe Declaration on Regional Security" drive much of the cooperative work with South Pacific neighbors.⁹ China is now New Zealand's largest trading partner by both value and volume (24.9 percent of exports in 2018).¹⁰ New Zealand is part of the Comprehensive and Progressive Trans Pacific Partnership (CPTPP) and also remains engaged in negotiations for the Regional Comprehensive Economic Partnership (RCEP), initiated by China. The breadth of engagement indicates a preference for a range of multilateral rules-based agreements alongside high quality bilateral trade agreements.¹¹

As the author argued in a companion volume on Maritime Power in Indo-Pacific, economic prosperity is central to New Zealanders' concept of security, supported by sovereignty and maritime resource security.¹² The reliance on, and responsibility for, a vast maritime zone is particularly relevant to the strategic analysis influencing New Zealand's airpower priorities and choices. Key features of the maritime zone include the fourth largest Exclusive Economic Zone, encompassing offshore islands territory to the North and South of the mainland, and an even larger Search and Rescue Region stretching from the equator to the South Pole.¹³ Foreign affairs and defense responsibilities include the wider Realm of New Zealand; freely associated nations Cook Islands and Niue, as well as two dependent territories of Tokelau and the Ross Dependency (the latter part of New Zealand's Antarctic claim).¹⁴ The physical challenges of distance and access in the South West Pacific drive airpower capability range and endurance

requirements. They also drive the need for NZDF Joint Force projection and sustainment capability.

New Zealand takes a comprehensive approach to national security, formally described in the National Security System Handbook as “all hazards – all risks.”¹⁵ In the absence of a formal declared National Security Strategy a range of thematic policies with defense and foreign affairs at the center collectively sets out security priorities for New Zealand. Risks are managed through the Department of Prime Minister and Cabinet. The last white paper for defense was released in 2016.¹⁶ Policy has since been updated by the new administration’s *Strategic Defence Policy Statement 2018* (SDPS 2018).¹⁷ A core theme in policy is now the contribution of defense to the “Community, Nation, and World,” replacing earlier systems of priorities based on concentric geographic zones radiating from New Zealand territory. Notably, the new policy elevates security of Antarctica, the Southern Ocean, and South Pacific to be equivalent priority with New Zealand territory.¹⁸ This construct has implications for defense force structure, capability, and operational priorities.

In practice there is a long-standing expectation from both center-left and center-right governments that ministries and agencies work together with an “All of Government” (AoG) security mindset. Agencies are loosely coordinated at both the strategic and operational level within a National Security System largely focused on response to and recovery from adverse domestic events. Within this system, the AoG approach requires shared resources, coordinated priorities, and integrated operational planning.¹⁹ The AoG approach can be seen in everything from border and maritime security, to environmental protection, to responses to natural disasters, transnational crime, and destabilizing security crises. The consequence for airpower elements of the defense forces is a broader set of requirements, roles, and tasks than many other nations.

New Zealand’s comprehensive security approach means that other government agencies with security sector responsibilities have a greater voice in setting requirements for the NZDFs airpower capabilities than is likely the case for many of our partners. Examples of Agencies and their interests include: Ministry for Primary Industries (biosecurity and fisheries), New Zealand Customs Service (border protection and transnational crime), Ministry of Foreign Affairs (diplomacy and foreign aid), Police (community security, counter terrorism), and the intelligence community. Support for integrated security outcomes is now formally recognized as part of NZDF Outputs and the NZDF owns and operates most of the major maritime and airpower platforms that deliver pan-government security outcomes.²⁰ People, ships, aircraft, and other major elements of NZDF capability are routinely engaged on a wide range of security-related tasks that are the primary responsibility of other government agencies, as well as remaining trained and prepared for traditional military force projection and roles across the spectrum of conflict, including combat. Tension between requirements is influenced by a low level of strategic security anxiety in New Zealand and comparatively modest levels of defense spending (approximately 1 percent GDP).²¹ Over time the absence in policy of traditional threats to sovereignty necessitating

response by military forces – particularly direct defense of the national sovereignty – has altered the mix of defense capabilities, including those in the airpower domain.²² As strategist Colin S. Gray observes, context both prejudices and enables the strategic influence of airpower. The shape and size of a particular country's air force is highly variable, tailored to circumstances, and airpower is necessarily constrained by the national capacity to acquire and employ it.²³

Contemporary New Zealand airpower

Themes in discourse on New Zealand's security environment that have most impact on airpower capability choices include: protection of sea, air, and electronic lines of communication; supporting the rules-based international order; obligations to respond to regional crises (including impacts of climate change); and relative influence in the Pacific.²⁴ Contemporary military airpower in New Zealand's context therefore focuses on the doctrinal roles of Air Mobility and Intelligence, Surveillance, and Reconnaissance (ISR). Missions are enabled by functions of Command and Control (C2) as part of a joint force, force protection, and force generation and sustainment.²⁵

The Air Force provides airborne ISR primarily through the Airborne Surveillance and Response Force (ASRF), currently utilizing six P-3K2 Orion Maritime Patrol Aircraft (MPA), to be replaced by four P-8A Poseidon MPA from 2023. ASRF capability includes Air and Joint mission support and intelligence for C2, processing, exploitation, and dissemination. Air Force also provides Air Mobility forces including battlefield mobility for land forces using medium utility NH90 helicopters and the smaller A109 helicopter. The Fixed Wing Transport Force (FWTF) operates modified civ-combi B757s and C130H(NZ) Hercules to provide inter-theater force projection and sustainment, as well as intra-theater air mobility. Civilian charter or cooperative airlift with partner nations fills the heavy military airlift gap.

Naval airpower is based on the SH2G(I) Seasprite helicopters, which operate primarily as part of the Royal New Zealand Navy's (RNZN) frigate combat system.²⁶ They also undertake training, air mobility, and ISR tasks when embarked on other ships or from bases ashore. As noted earlier, the vast maritime domain drives force planning toward joint force projection. Navy also relies on Air Force's ASRF for surveillance and maritime patrol of surface and sub-surface targets.²⁷ Air Force NH90 helicopters traditionally used for land-based air mobile operations are developing capability to operate with amphibious task groups to a much greater extent than envisaged when they were first acquired.²⁸ The Navy is also introducing small Remote Piloted Air Systems (RPAS) to enhance ships' ISR capability.²⁹

In other areas forces of lower policy priority have been drawn down. Capabilities are no longer maintained for the doctrinal airpower roles of Control of the Air, and Strike is limited. The NZDF has not maintained a dedicated air strike capability since a change of government policy in 2000 led to disbandment of the Air Combat Force and its maritime attack Skyhawk fleet in 2001.³⁰ These

roles are no longer included in the scope of independent operations that underpins force structure choices.³¹ Some maritime air response strike options are still provided by Maritime Patrol Aircraft or Naval Helicopters operating with the ANZAC Frigates. The NZDF also has no attack helicopters or armed RPAS. The medium utility NH90 helicopter is equipped for self-protection in support of land forces tactical mobility, aeromedical evacuation, and counter terrorism air-borne support roles, supplemented by the A109 light utility helicopter that is primarily used for training.

The Royal New Zealand Air Force (RNZAF) is the lead proponent of air-power in the New Zealand Defence Force and capability owner for most operational airpower assets. Exceptions include short range micro and small unmanned aerial vehicles (UAVs) that can be owned and operated organically by any NZDF unit. Even then, Air Force provides safety and airworthiness regulations and advice. The Chief of Air Force is the NZDF airworthiness authority, and principal adviser to CDF – and through him to the Minister of Defence – on airpower matters. This arrangement, in contrast to larger forces where Army and Navy often also have an Air Arm or Air Corps, reflects the efficacy of concentrating air-environment doctrine, operating and technical airworthiness expertise within a defense force of modest size and resources.

Naval combat helicopters, for example, are organized in a uniquely integrated way as No. 6 Squadron of the RNZAF. Flown by Naval aviators, or Air Force pilots if required, they are also maintained by Air Force technicians both ashore and embarked. Naval aircrew are initially trained by the RNZAF, brought to full readiness jointly by Air and Navy, and then operationally commanded by the Navy's Maritime Component Commander once embarked on RNZN ships for exercises or operations. Operational doctrine for No. 6 Squadron is therefore informed by both air and maritime power bodies of knowledge. In contrast, other New Zealand security sector agencies maintain only modest airpower capabilities.

Civilian airpower capabilities in New Zealand fill a range of domestic security, industry (agriculture, tourism, transport), or emergency responder roles. The New Zealand Police Air Support Unit operates from contracted "Eagle" helicopters (twin engine Bell 429) based from the largest city of Auckland.³² Police also rely on the NZDF helicopters to provide greater lift and under-slung capacity, as well as specialist counter-terrorist support. At the other extreme, New Zealand Coast Guard is a charitable organization focused on volunteer in-shore waters search and rescue, with only two air patrol units in Auckland and Northland.³³ New Zealand Coast Guard has no statutory powers; maritime security enforcement is vested in Maritime New Zealand, Police, Ministry of Primary Industries, and Customs. Civilian rescue helicopter and air ambulance services are provided by a network of charitable trust operators. Most other agencies do not own or operate their own airpower capabilities and many rely on NZDF assets to achieve tasks requiring air capabilities.

Domain awareness and tasking priorities for many civilian agency tasks – particularly in the maritime zone – are managed through an operationally

independent National Maritime Coordination Centre.³⁴ The AoG system is maturing its ability to maximize the value of airpower and options are being explored to enhance surveillance and response in the Pacific region. Prudent use of national resources suggests the RNZAF is likely to remain a leading provider of multi-use airpower capabilities in future. Relevant agencies can therefore be expected to remain demanding stakeholders as the NZDF's remaining end-of-life airpower assets are replaced in the next decade.

The modernization imperative

The refreshed SDPS 2018 defense policy provides the contemporary basis for defense capability planning. As noted earlier, SDPS 2018 builds on the 2016 white paper while realigning defense policy with the Foreign Affairs-led "Pacific Reset" and sets the security of the South Pacific, Antarctica, and the Southern Ocean on par with New Zealand territory. More recently, and uniquely, *The Climate Crisis: Defence Readiness and Responsibilities* provides specific policy guidance for adapting operations in the Pacific to the effects of climate change.³⁵ The DCP 2019 draws this suite of policy guidance together, setting a modernization plan out to 2035 that aims to balance the enduring needs of core military roles with those of broader national security response tasks.

The Defence Minister, introducing the SPDS 2018, stated the need for "highly sophisticated capabilities that deliver for New Zealand and that are valued by and interoperable with those key partners that share our values and interests."³⁶ High priority airpower capabilities include purchase of four new Boeing P-8A Poseidon Maritime Patrol Aircraft by 2023, announced in 2018. Shortly after the release of the new capability plan, the Minister of Defence also announced C-130J-30 Super Hercules medium mobility aircraft as the preferred option to replace the current C-130H(NZ) Hercules and the highest priority in DCP 2019.³⁷ Further capabilities to complement the P-8A and enhance maritime domain awareness are also planned but not yet confirmed.³⁸ During the 2020s the plan also indicates replacements for remaining legacy airpower platforms, including strategic airlift and naval aviation. Difficult choices may lie ahead in finding an optimum balance of strategic and intra-theater fixed wing mobility, as well as meeting both naval combat and maritime utility helicopter requirements in New Zealand's small force structure.

There is a clear imperative in policy and capability plan to replace airpower systems that were acquired in the 1960s and are now increasingly challenged by obsolescence and availability, albeit still operationally capable due to a series of major system upgrades. In recent years the P-3K2 Orion received its last major system refresh in the form of an "Underwater Intelligence, Surveillance and Response" upgrade that restored capability for Anti-Submarine Warfare.³⁹ New Zealand is, however, arguably well behind key partners in adopting and adapting other modern systems for NZDF operations, for example so-called aerial "drones." Recent projects include the introduction of small UAVs for organic use by tactical units. RPAS with higher payload and long endurance for strategic

national security tasks, including Maritime Domain Awareness, remain aspirational.⁴⁰ Options for more capable small systems are being considered but larger complex RPAS, although now forecast in DCP 2019 for the 2030s, remain subject to future defense white paper analysis in 2022.⁴¹ Any proposals for armed RPAS are likely to be controversial.

The final area of significant technology uplift (noting Space is outside the scope of this book) is the simulation systems being acquired with most modern airpower systems. In the short term installing simulators as part of RNZAF squadrons brings efficiency and mission availability gains. The longer-term potential includes distributed mission simulation to support readiness training for core military roles and enhanced interoperability for both joint and combined operations. An acquisition strategy that prioritizes systems that are proven in service and interoperable with partners should enable effective integration of new capability, once resources are available, including essential new personnel capacity and skills.

Use of airpower

Airpower capabilities operated by the Royal New Zealand Air Force are first and foremost trained and prepared to provide response options to government as part of an NZDF-led Joint Task Force or Joint Interagency Task Force. They conduct tasks operating in or from New Zealand, or deploy as national contributions to coalition or United Nations-led missions. The military training program includes a range of bilateral exchanges and exercises to build skills, particularly with Australia, multilateral activities that contribute to regional cooperation, and deployments to complex exercises that validate high level preparedness. Operations and tasks range from international diplomacy, humanitarian response, through security crisis stabilization, to control of critical sea and air lines of communication, and, in extremis, being prepared to contribute to coalition combat operations.

Standing contemporary air missions include global projection and sustainment of deployed forces, and regional surveillance. Over the last two decades, NZDF has provided airlift support for multiple NZDF rotations deployed on security stabilization assistance and peacekeeping operations in Timor Leste, the Solomon Islands, Tonga, Afghanistan, and Iraq using B757 for inter-theater lift and C130 Hercules for intra-theater air mobility.⁴² They routinely operate from forward operating bases in the Middle East for several weeks, and hub-and-spoke operations are common in the Pacific. No. 3 Squadron's former UH-1H Iroquois utility helicopters were integral to security stabilization and assistance operations in Timor Leste, deploying from 1999 to 2003 and from 2007 to 2008.⁴³ The new NH90 helicopters have participated in major regional exercises and in 2019 were deployed in support of Solomon Islands elections, operating alongside Australian helicopters.⁴⁴ ASRF task groups centered on the P-3K2 Orion have been deployed to monitor shipping lanes in the Indian Ocean and Western Pacific, conducting counter piracy, counter narcotics, and sanctions enforcement.⁴⁵

Regionally, the P-3K2 is also tasked in support of collective Forum Fisheries Agency programs focusing on compliance with regional agreements, for example to manage migratory tuna. New Zealand air and maritime power assets provide bilateral support to South Pacific countries for their area surveillance and control tasks, as well as regional policing and customs initiatives that prevent and respond to transnational crime. The Ministry of Foreign Affairs (MFAT) leads response to humanitarian crisis and disaster in the Pacific, as well as activities to uphold international agreements. For example, monitoring and enforcing compliance with the Convention on Conservation of Antarctic Marine Living Resources (CCAMLR) in the Southern Ocean brings a range of relevant agencies together. Airpower also contributes to Antarctica NZ operations via intercontinental airlift as part of a shared logistics arrangement with the United States Antarctic Program.

Multi-agency missions to the Indo-Pacific region are common. New Zealand responded with C-130 Hercules airlift to Aceh following the Indonesian Tsunami of 2005. Another Pacific Tsunami in 2009 saw all elements of New Zealand's military airpower engaged in providing emergency assistance to Samoa and Tonga. Similar deployments are common after major Pacific cyclones and involve multiple regional partners, for example the response to cyclone Pam which hit Vanuatu in March 2015 led to a large combined South Pacific response. The intensive search for missing civilian flight MH370 in 2014 saw the ASRF and P-3K2 operating from Western Australia alongside a wide range of partners. Fisheries management, search and rescue, and Antarctic support capabilities coalesced in December 2011 with a complex task that saw an RNZAF C-130 Hercules airdrop a Navy salvage pump and rescue equipment onto an ice floe, adjacent to a damaged Russian fishing vessel trapped in ice deep in the Ross Sea, about 7 hours flight time South of New Zealand.

Close to home, standing tasks include NZDF Joint Force readiness exercises, aid to the civil power (Police), Civil Defence (local disaster) response, and Antarctic logistics. The multi-agency support imperative sees New Zealand Customs supported by NZDF helicopters or surveillance aircraft as required for operational enforcement tasks. In a similar manner NZDF airpower supports Maritime NZ to monitor safety at sea compliance and Search and Rescue, the Ministry of Primary Industries with fisheries and other resource surveillance, and Environment Ministry with environmental disaster response operations.

Challenges and change

The single biggest challenge facing New Zealand's future airpower is the pace and cost of advances in military technology, set against expectations for multi-role platforms to fill a broad range of multi-agency tasks.⁴⁶ New capability programs will only partially close the gap with close allies and partners introducing fifth-generation air capabilities. The acquisition of P-8A Poseidon is the best example of a generational step forward, providing the funding to maintain spiral upgrades through life is sustained and the force can adapt to new training, C2

and mission support systems, and deployed sustainment models. The fixed wing mobility fleet, on the other hand, is at a crossroad. The Hercules is the workhorse of the NZDF, supporting a range of tasks from global strategic airlift to tactical insertion of Special Forces. An incremental replacement approach and pursuit of quick introduction to service, for example of a basic C130J-30 configuration, or a smaller fleet, could constrain future operational flexibility. Decisions are also yet to be made on replacing the strategic airlift platform (currently B757). For both, focus on low-complexity airlift tasks could be at the expense of the opportunity to develop and deploy globally relevant military capability. There are implications for agility in complex operational environments, credibility with military partners, and force protection in uncertain or contested operational environments.

Agility depends on depth in air personnel skills and experience gained through sophisticated training, responsive Command and Control systems, and best practice operational doctrine. Smaller fleets of RNZAF aircraft, high demand to train and be prepared for multiple roles, and more concurrent missions will challenge the ability to provide all airmen with the exposure to the training and international exercises essential for developing higher order skills and interoperability. For example, the medium mobility helicopters are expected to develop and maintain a range of skills in support of doctrinal land maneuver tasks. Skills for air-land, airborne, and air-assault operations, including in support of urban and maritime counter terrorist roles of Special Forces, and ship deck-landings must all be maintained concurrently by one squadron operating eight NH90 helicopters.⁴⁷ Depth in crew numbers and potentially greater sub-specialization within squadrons will likely be required to manage this in future, but concurrent tasking remains a challenge given the trend to smaller numbers of aircraft across all the modernizing fleets.

Adaptability and innovation will be essential to exploit the full potential of simulation. It will also be required to maximize the ISR domain awareness effects of the range of space-based, remote-piloted, semi-autonomous, and conventional manned capabilities that are likely to be in service by 2035. While bleeding-edge developmental technologies such as hypersonic aircraft are unlikely to be fielded by the RNZAF, adapting to their existence with partner forces and adversaries will not be optional.⁴⁸

How much latent capacity to scale up in a major crisis is needed? This is a subjective strategic challenge but a perennial one for small air forces striving to remain interoperable with technologically advanced partners. The cost and complexity of acquiring and sustaining modern platforms and their software systems, cost of skilled personnel, and lead times to train both air and ground crew all lead to leaner peacetime standing force structures. Skilled personnel are constantly in demand by civil airlines and the wider aviation industry. A limited amount of surge capacity can be maintained in reservist forces and simulators will make this more viable in future. If a challenge affects only New Zealand then utilizing partners' larger capacity training systems and industrial production capacity is likely viable. This assumption is less likely to hold in the event of

adverse global trends – such as a world-wide pilot shortage – or a major inter-state conflict that sees key partners likely facing the same challenges and prioritizing their own needs.

Space and Cyber are topics for another book, but will nevertheless be key influences on the RNZAF and airpower in coming decades. A focus on the information domain for warfighting edge presents both opportunities and challenges. As Artificial Intelligence, machine learning, and semi-autonomous systems influence development of new capabilities, New Zealand's airpower proponents will also need to prepare for new command and control, legal, ethical, and moral challenges. For example, will future rules of engagement – and the trust of the New Zealand people – allow RNZAF airborne sensors to operate as part of a networked combat force with coalition strike capabilities supporting combined land forces? Will partners retain sufficient confidence in the New Zealand Defence Force skills and capability, and in our ability to usefully contribute to protecting the rules-based order? Answering these questions will require the knowledge vested in NZDF's airpower proponent, the Royal New Zealand Air Force, to continue to include doctrinal awareness and experience well beyond the confines of the permissive environment tasks most commonly undertaken in support of New Zealand's' broad regional security interests.

Conclusion

New Zealand airpower has been refocused since 2000 on roles of Air Mobility, Airborne Intelligence, Surveillance and Reconnaissance, and Naval Combat Aviation. The breadth of roles and tasks expected of this small airpower force in support of a comprehensive “all of government” approach to security is extensive. Key challenges are the affordability of high-end technology and skilled people, all-of-government requirements that drive multi-role equipment (in tension with military skills and interoperability), capacity to sustain concurrent operational tasks, and how to maintain latent force scalability for an uncertain future.

Although focused on a narrower range of airpower capabilities than was fielded during the twentieth century, New Zealand's military airpower in many respects has a broader range of tasks than ever. Airpower is always a vital first responder to Pacific emergencies, continues to provide credible interoperable contributions to coalition operations, and the RNZAF is the provider of choice for airpower capability across New Zealand's “all hazards – all risks” national security system.

Notes

- 1 The views expressed are those of the author and are not the official policy or position of the New Zealand Government or the New Zealand Defence Force.
- 2 O'Brien, 2016, p. 9. See also McCully, 2016, p. 9.
- 3 Ministry of Foreign Affairs, 2018, p. 5.
- 4 Ministry of Defence, 2018, p. 27.

- 5 Ministry of Foreign Affairs, 2018, pp. 28–29.
- 6 Ministry of Defence, 2018, p. 14.
- 7 U.S. Department of State, 2019.
- 8 Ministry of Defence, 2016, p. 5. McKinnon, 1993, pp. 7–13.
- 9 Pacific Islands Forum Secretariat, 2018.
- 10 Workman, 2019.
- 11 Ministry of Foreign Affairs, 2018, p. 10.
- 12 Abraham, 2018, p. 156.
- 13 Te Ara, 2019a; and Governor General of New Zealand, 2019.
- 14 Te Ara, 2019b. For Antarctica see Te Ara, 2019c; and Ministry of Foreign Affairs, 2019.
- 15 Department of Prime Minister and Cabinet, 2016, p. 2.
- 16 Ministry of Defence, 2016.
- 17 Ministry of Defence 2018.
- 18 Ministry of Defence 2018, pp. 12–13, and Foreword.
- 19 Department of the Prime Minister and Cabinet, 2016, pp. 4, 27.
- 20 Output 4 includes: Resource and Border Protection, Defence International Engagement, Assistance to the Civil Power (emergency), Assistance to civil authorities (non-emergency), and Defence Support to the Community. New Zealand Defence Force, 2018, pp. 69–76.
- 21 Global Security, 2019. For detailed New Zealand defense spending forecasts see New Zealand Government, 2019.
- 22 Hoverd, 2017, p. 20.
- 23 Gray, 2012, pp. 301–302.
- 24 Responding to regional crises, climate change, and resource protection resonate in public commentary. See for example Kirk, 2019. Concerns around increasing third party influence are seen clearly in the Strategic Defence Policy Statement 2018. Ministry of Defence, 2018. pp. 6–7, 17. For climate change see: Ministry of Defence and New Zealand Defence Force, 2019.
- 25 Royal Australian Air Force, 2013, p. 4.
- 26 Directorate of Sea Power and Warfare, 2018, p. 109.
- 27 Directorate of Sea Power and Warfare, 2018, p. 110.
- 28 New Zealand Defence Force, 2018, p. 41.
- 29 Directorate of Seapower and Warfare, 2018, p. 109.
- 30 New Zealand Government, 2000, pp. 3–5.
- 31 Ministry of Defence, 2019, pp. 8–10.
- 32 New Zealand Police, 2019. See also Neale, 2019.
- 33 New Zealand Coast Guard, 2019.
- 34 Controller and Auditor General, 2010, p. 3.
- 35 The informal “Pacific Reset” title has been used by various Ministers since 2018. The framework is outlined in cabinet paper “New Zealand in the Pacific.” Office of the Minister of Foreign Affairs, 2018. For climate change implications see: Ministry of Defence and New Zealand Defence Force, 2019.
- 36 Ministry of Defence, 2018, foreword, p. 3.
- 37 Ministry of Defence, 2018, p. 3, 29. See also Mark, 2019, press release.
- 38 Ministry of Defence, 2019, p. 14, 22.
- 39 Ministry of Defence and New Zealand Defence Force, 2016, p. 52.
- 40 Small “drone” systems are usually called Unmanned Aerial Vehicles/Systems (UAVs are part of a UAS). In the NZDF context the term RPAS is used more generically to reflect that suitably qualified human operators (for large systems, qualified pilots) are in control of Remotely Piloted Aircraft and essential to the operation of the overall “system” (e.g., airborne ISR) that tasks and exploits RPAs.
- 41 Ministry of Defence, 2019, pp. 20–30, 40.
- 42 New Zealand Defence Force, 2019a. See also McLure, 2012.
- 43 New Zealand Defence Force, 2019a.

- 44 New Zealand Defence Force, 2019b.
- 45 New Zealand Government, 2018.
- 46 For competing requirements in Air Surveillance, see: Moremon and Oliver, 2018, pp. 75–79.
- 47 Army General Staff, 2017, p. 61.
- 48 For a discussion of hypersonic airpower implications, see: Hallen and Spencer, 2018, pp. 65–70.

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Part III

The Eastern Indian Ocean and the Indian sub-continent



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10 The Eastern Indian Ocean

Richard A. Bitzinger

Over the past decade, the Indian Ocean region has increasingly become a zone of competition between two aspiring great powers, China and India. As a recent report by the US Congressional Research Service noted, this rivalry “is driven to a large extent by their economic rise and the rapid associated growth in, and dependence on, seaborne trade and imported energy, much of which transits the Indian Ocean,” adding that “there seems to be a new strategic focus on the maritime and littoral regions that are adjacent to the sea lanes that link the energy rich Persian Gulf with the energy dependent economies of Asia.”¹

Much of this strategic competition stems from China’s increasing penetration of the Indian Ocean region (IOR), particularly “China’s developing strategic presence and infrastructure projects in places such as Pakistan, Sri Lanka, Burma (Myanmar), and Djibouti.”² This intrusion is mostly found in China’s efforts to sanction and make permanent its access to the IOR, particularly found in two initiatives: the “string of pearls,” a bases-and places scheme intended for Chinese maritime forces, and the transit-infrastructure project embodied in its Belt and Road Initiative (BRI). These programs in turn collide with India’s tendency to view the IOR as its “rightful nautical preserve.”³

Roughly a dozen years ago, it was all the fashion to speak of China’s “string of pearls”: a chain of bases, ports, and even airfields stretching from the South China Sea, through the Singapore-Malacca Straits, across the Indian Ocean and to the Red Sea and the Suez Canal. If not directly owned or controlled by China, this network-of-access would permit the People’s Liberation Army Navy (PLAN), the naval arm of the Chinese military, to become a more or less permanent feature in the Indian Ocean. As a result, the PLAN could secure China’s access to some of its most important sea-lines of communication (SLOCs), safeguarding the critical flow of energy supplies – and particularly crude oil – from the Middle East and protecting China’s trade routes to Europe.

At the time (i.e., the middle of the last decade), the “string of pearls” concept mainly was a Western construct – i.e., speculation as to a Chinese strategy that did not really exist at the time. At least, not yet. While today China might not possess a coherent constellation of “bases and places” stretching across the Indian Ocean, it is increasing its global reach more than ever before. This is apparent in Beijing’s establishment of its first overseas military base in Djibouti,

a small country in the Horn of Africa. In conjunction with this event, an article in *China Military*, the official English-language news website for the PLA, explained that “the PLA’s responsibilities today have gone beyond the scale of guarding the Chinese territories,” requiring it to “protect China’s interests anywhere in the world. Overseas military bases will provide cutting-edge support for China to guard its growing overseas interests.”⁴

Beijing has strong and growing strategic interests, and those are increasingly taking it beyond the near waters of the South and East China Seas and well into the Indian Ocean. In particular, the eastern Indian Ocean is of growing and increasingly diversified significance to Beijing. These particularly include securing SLOCs through the Indian Ocean and to South Asia, Europe, Africa, and the Middle East; increasing economic ties with these regions (as well as with Southeast Asia); and legitimizing its own global security role (while also limiting or diluting US influence).

Nevertheless, as China seeks to expand into the IOR, this has brought it into increasing conflict with India, as these two would-be great powers vie for preeminence – or even hegemony – in the region. The goal of this chapter, therefore, is to provide a political and strategic context for the security challenges that have been affecting the eastern Indian Ocean since the end of the Cold War. Of key importance is the emergence of China as a military presence in the Indian Ocean, especially the eastern IOR, following upon its growing economic and political activity touching upon this region.

China’s expanding naval footprint: from the South China to the Indian Ocean

China’s growing global footprint is, if anything, largely the result of its expanding international economic and commercial interests. As James Holmes of the US Naval War College asserted in *World Politics Review*, China is increasingly “taking its cue” from Alfred Thayer Mahan, the “pre-eminent sea-power theorist” of the late nineteenth century.⁵ For Mahan, Holmes wrote, “commerce was king” – a view that defines China’s current approach to sea power. Holmes added:

In concrete terms, Mahan declares that sea power rests on three pillars: industrial production at home and markets overseas; merchant and naval fleets; and naval stations scattered along important sea routes to support those fleets. Put in its simplest terms, that amounts to commerce, ships and bases.⁶

This is evident in Beijing’s push for such China-centric initiatives as the Asian Infrastructure Investment Bank and the BRI. In particular, the sea-based aspect of this plan – the so-called Maritime Silk Road – depends heavily on a network of ports and other coastal infrastructure projects, stretching from “Quanzhou in the Fujian province and culminating in the northern Mediterranean Sea,” granting China improved access to the “strategic pathways of the Indian Ocean [and] alleviated access to Gulf oil.”⁷

It all starts in the South China Sea (SCS) – easily China’s most militarized maritime area and, accordingly, the jumping-off point for its new globalized ambitions. Beijing has already pretty much declared the SCS to be a Chinese lake, subject to its “indisputable sovereignty.” Moreover, a number of recent moves have made it increasingly clear that China intends to make the SCS its exclusive military operating area.

China’s “creeping assertiveness” in the SCS now appears to be migrating to the IOR. Indeed, it is in the IOR where China’s military footprint has been the most recent and far-ranging, and therefore the most disquieting. This is in keeping with the third element of the Mahanian strategy, which requires a string of naval bases, or at least base access.⁸ It is in the Indian Ocean, for example, where China has established its first overseas base, in Djibouti – strategically located near some of the world’s busiest shipping lanes, controlling access to the Red Sea and the Indian Ocean. It serves as a key refueling and transshipment center and is the principal maritime port for imports from and exports to neighboring Ethiopia.

China does not call its Djibouti establishment a “naval base.” Rather, it is designated a “logistical support facility ... not responsible for combat operations.”⁹ One of its declared functions, for example, is to service PLAN vessels conducting anti-piracy operations in and around the Horn of Africa. This base, capable of accommodating up to 6,000 personnel, opened in mid-2017. Beijing will pay the government of Djibouti US\$20 million a year to keep it operational.

Other elements of China’s putative “string of pearls” in the Indian Ocean are less perhaps impressive but still potentially game-changing. There are several deep-water ports along the Asian and African coastlines where the PLAN could gain access and succor. More to the point, many of these ports and harbors were built, and often are operated, by Chinese companies, some of them state-owned. China has built deep-water ports in Sri Lanka, in Colombo and Hambantota; Pakistan, in Gwadar and Karachi; Myanmar, in Sittwe; and the Seychelles, in Port Victoria.¹⁰

In fact, there have already been cases where PLAN ships have used these commercial ports. Since 2014, a PLAN *Song*-class and a *Han*-class nuclear-powered submarine docked at the port of Colombo – which, incidentally, is constructed, run, and controlled by China Merchants Holdings; other PLAN warships have also used this port. In 2015, a *Yuan*-class sub was spotted at the port at Karachi, which is controlled by Chinese Overseas Port Holdings.¹¹ Incidentally, Pakistan is currently buying eight *Yuan*-class subs from China. It is also likely that the PLAN intends to use the port in the Seychelles as a refueling point for anti-piracy operations. Other potential dual-use commercial ports include Moresby, Papua New Guinea; Sihanoukville, Cambodia; Koh Lanta, Thailand; Dhaka, Bangladesh; the Maldives; Lagos, Nigeria; Mombasa, Kenya; Dar-es-Salaam, Tanzania; Luanda, Angola; and Walvis Bay, Namibia. It is also worth noting that China controls one-fifth of the world’s container fleet, and that its shipyards have built approximately 40 percent, measured by tonnage, of all commercial ships.

In addition, the Chinese shipping giant Cosco has stakes in shipping terminals in Antwerp, Suez, Singapore and Piraeus, Greece.¹²

Consequently, the long-speculated – and, by some, feared – “string of pearls” may someday become a reality. China is gaining the expeditionary military capability, bases, and access to dual-use seaports and deep-water harbors to sustain naval operations stretching from the SCS to the Horn of Africa.

On the other hand, it cannot be said that China currently possesses a global military presence like, for instance, the U.S. Navy. The PLAN is most definitely not a blue-water navy in the strictest sense. It has a long way to go before it can create a sustainable open-ocean power-projection capability. And its footprint will likely remain confined to the Western Pacific and parts of the IOR. That said, the combination of a more far-ranging Chinese navy, the PLA’s new base in Djibouti, its ability to access a chain of ports along the Asian coastline, and a growing Chinese shipping industry underscore not only Chinese ambitions to become a global naval power, but also its determination to make it happen.

This global presence has, unsurprisingly, led to new responsibilities and new tasks for the PLA, and especially for the PLAN. As laid out in China’s 2015 white paper on defense, these include safeguarding “the security of China’s overseas interests,” as well as promoting “China’s security and interests in new domains.”¹³ The document characterizes the maritime space as critical for “enduring peace, lasting stability and sustainable development of China,” urging an end to “the traditional mentality that land outweighs sea” and stressing the need for China to modernize its maritime military force structure to meet pressing national security and development interests.¹⁴ These objectives mean that particular importance will be placed on the PLAN and its ability to project power.

China’s aggressive and concerted efforts to modernize and transform its armed forces has been well-documented elsewhere and does not bear repeating. However, it suffices to say that China has noticeably improved its military capabilities in several specific areas – particularly missile attack, precision-strike, and in terms of power projection at sea and in the air. Ultimately, the PLA seeks to turn itself into a modern, network-enabled fighting force, capable of projecting sustained power far throughout the Indo-Pacific region. If successful, then the long-term trends in Chinese military modernization have the potential, in the US Department of Defense’s words, to “pose credible threats to modern militaries operating in the region.”¹⁵

The PLAN has made particularly significant progress in modernization. Since 2000, China has constructed at least 22 modern destroyers of the Type-51 and Type-052 class, bolstering its efforts to stand out as a world-class navy.

In addition, China has added more than two dozen new frigates to its forces – particularly the Type-054A *Jiangkai*-class, which features a stealthy design and is armed with antiship cruise missiles (ASCMs) and surface-to-air missiles (SAMs) in vertical launch systems (VLS) – as well as the new-generation Type-022 *Houbei*-class catamaran-hulled missile fast attack craft, outfitted with YJ-83 ASCMs, of which at least 60 have been built.

China has also greatly expanded its submarine fleet over the past 15 years. Since the late 1990s, the PLAN has acquired at least 26 Type-039 *Song*-class and Type-41 *Yuan*-class diesel-electric submarines. These submarines, along with the *Kilos*, can serve many functions – anti-surface, anti-submarine, mine-laying, special operations, etc. – providing the PLAN with a versatile (and stealthy) capability for long-range power projection. Finally, the PLAN has begun deploying a new type of nuclear-powered attack submarines, the Type-093 *Shang*-class; at least five *Shang*-class submarines are believed to be in service.

Particularly apropos to long-range force projection is the PLAN's recent acquisition of large expeditionary warfare ships. In recent years, China has launched at least seven Type-071 *Yuzhao*-class 17,000- to 20,000-ton LPD (landing platform dock) amphibious warfare ships, equipped with two helicopters and two air-cushioned landing craft (LCAC), and capable of carrying up to 800 troops. In addition, at least three in a class of larger, LHD-type (landing helicopter dock) amphibious assault ship, the Type-075, is under construction.

In perhaps its most dramatic development, the PLAN has recently begun to acquire aircraft carriers. Its first such acquisition was the former Soviet carrier *Varyag*. The rebuilt carrier underwent its first sea trials under PLAN colors in August 2011, and was subsequently commissioned the *Liaoning* and accepted into service with the PLAN in 2012. The *Liaoning* is equipped with the J-15 fixed-wing fighter jet – reportedly reverse-engineered from a Su-33 acquired surreptitiously from Ukraine – along with anti-submarine warfare and airborne early-warning helicopters.

More importantly, China has begun to construct its own indigenous carriers. In 2017, the PLAN launched the Type-001A, built at the Dalian shipyards, and a second indigenous carrier (Type-002) is under construction. Speculation is that the PLAN will eventually acquire at least four aircraft carriers. If and when that happens, it would likely mean the reorientation of the PLAN around Carrier Battle Groups (CVBGs), with the carrier at the heart of a constellation of supporting submarines, destroyers, and frigates – an amalgamation of power projection at its foremost. Such CVBGs are among the most impressive instruments of military power, in terms of sustained, far-reaching, and expeditionary offensive force, and such a development would constitute a major shift in PLAN strategic direction especially when it comes to the IOR.

India's anti-China “counteroffensive” in the Eastern IOR

Like China, India has great-power ambitions. India is an aspiring great power, but at this point its challenge is to operate as a power on the subcontinent and in the Indian Ocean.¹⁶ The Indian military still has considerable problems with projecting power even into the nearby seas. New Delhi, as part of its “Look East” (first introduced by Prime Minister Rao) and Modi's subsequent “Act East” policies, is becoming increasingly active in both the eastern Indian and the western

Pacific oceans.¹⁷ In a practical sense, the Indian Navy established a joint command in the Andaman Islands, in order to provide improved surveillance and intelligence-gathering in the eastern Indian Ocean. At the same time, it has deployed its most advanced warships and maritime patrol aircraft (including US-built P-8s) to its Eastern Naval Command, as well as increasing the overall numbers of ships and other equipment assigned to patrolling the eastern Indian Ocean.¹⁸

New Delhi, due in no small part to concerns over a growing Chinese presence in the Indian Ocean, has especially and increasingly attached greater stress to the force projection capabilities of the Indian Navy.¹⁹ According to Geoffrey Till:

The Indian Navy has increased emphasis on sea-based deterrence, economic and energy security, forward presence and naval diplomacy.... Over the past few years, there has been a notable expansion of India's internationalist concerns. This reflects its growing role in globalization.... [The Indian Navy's] current transformational emphasis is on developing their power projection and expeditionary capabilities, much of which could be deployed in the general defense of the system alongside their maritime partners.²⁰

India's new "Look/Act East" policies are a significant departure from New Delhi's traditional security outlook, with "its core interests" being typically focused on the IOR.²¹ In particular, India has sought to cultivate much closer economic and military ties with Southeast Asian nations, creating and strengthening both commercial and military maritime partnerships with Malaysia, Indonesia, Singapore, and Vietnam. India and Malaysia exchange information on the maintenance of *Scorpène*-class submarines (which are found in both countries' navies), while Singapore and India have conducted joint naval exercises (SIMBEX) since the mid-1990s. New Delhi and Hanoi are engaged in a broad array of economic and security cooperation, including joint oil and gas exploration in the SCS, Indian assistance to Vietnamese shipyards for the repair and maintenance of Vietnamese Navy warships, and access to Vietnamese ports by Indian naval vessels.²²

At the same time, New Delhi has discovered that it has a growing interest in maintaining the security of the Malacca-Singapore Straits. It has conducted anti-piracy and escort patrols in the straits over the past decade. In particular, it has increasingly emphasized multilateralism in its activities in the Malacca Strait, stating that the Indian Navy has "no intention of patrolling unilaterally," but rather it believes "in working with the Singapore, Malaysian, and Indonesian navies with whom we have joint programs."²³

Nevertheless, the Indian military faces many challenges. It is underfunded and remains overly dependent upon old (and aging) kit. Plans for expanding the number of ships in the navy or the number of fighter squadrons in the air force have gone unfilled for decades. The emphasis on domestic production and procurement has forced the Indian military to buy and operate underperforming and substandard equipment it does not particularly want. Moreover, most locally

developed weapons systems, such as the *Tejas* fighter jet or the *Arjun* tank, usually arrive late and overpriced, and of limited military utility. Additionally, the Indian armed forces have failed to develop the capabilities for joint operations, leaving Indian military branches unable to cooperate with and support each other properly. The Indian Navy actually does a better job when it comes to interoperating with the US Navy. There is growing military cooperation between India and some Southeast Asian countries, particularly Singapore, but this remains a relatively minor occupation. Overall, the Indian military looks quite significant on paper, but in terms of doctrine and operations it is probably premature to consider India to be the preeminent military power to be reckoned with, especially in the eastern IOR.

This could be changing. As China becomes more a sizable and permanent presence in the IOR, India has begun to react. As James Holmes has put it, “History predisposes Indians to view the Indian Ocean as a natural sphere of dominance ... India even depicts the Monroe Doctrine, the 19th century US policy that staked America’s claim to the Western Hemisphere, as one inspiration for its foreign policy and military strategy.”²⁴ At the same time, he notes that “while India wants to be the steward of regional security, at the same time it is a reluctant great power. India has long been a nonaligned power, and it has an allergy to any policy that might look like an imperial venture.”²⁵

Nevertheless, Holmes argues that New Delhi’s “proprietary feelings toward the Indian Ocean” are prompting it to act more decisively to counter China’s intrusions into the IOR. As such, India is engaging in its own “string of pearls.” In January 2018, for example, it signed a 20-year agreement with the Seychelles (technically in the western IOR) to build an airstrip and dockyard for the Indian Navy (IN). New Delhi has also negotiated port access for its warships in Iran and Oman.²⁶ In 2019, India signed an agreement with Myanmar to operate the latter’s port in Sittwe, a major counterblow to China’s BRI efforts.²⁷

Concurrently, India has embarked on an ambitious ship-construction effort to build up the IN. It is currently constructing a second-generation indigenously designed destroyer, designated the Project 15A *Kolkata*-class, following on the Project 15 *Delhi*-class ship. The first *Kolkata*-class destroyer was launched in 2006, but only three destroyers in this class were eventually built, instead of a planned seven. Instead, the *Kolkata*-class has been superseded by an improved vessel, the *Visakhapatnam*-class (Project 15B) destroyer. This class keeps the hull of the original vessel but is outfitted with a stealthier superstructure and sound and infrared suppression systems for stealth and outfitted with longer-range weaponry. The IN plans to acquire four *Visakhapatnam*-class ships, with the first vessel joining the IN by 2021.²⁸

Another key Indian shipbuilding program is the Project 17A *Shivalik*-class frigate, being constructed at the Mazagon Docks and at the Garden Reach Shipyards in Kolkata. The Project 17A is a guided-missile frigate in the 6,500-ton range, with “stealthy” features (structural, thermal, and acoustic) akin to the French *Lafayette*-class or the Chinese Type-054 frigates. It is armed with Russian *Klub* or *BrahMos* ASCMs and the Israeli-supplied Barak-8 surface-to-air

missile. Seven Project 17A frigates are planned. Additionally, the IN is acquiring 12 *Kamorta*-class corvettes, a 2,500-ton ship being constructed at the Garden Reach Shipyards.

Turning to undersea warfare, India is currently constructing under license six Franco-Spanish *Scorpène*-class diesel-electric submarines, which are being built at the Mazagon Docks shipyard. Six additional *Scorpène* subs may subsequently be ordered, although these plans may be superseded by an indigenous diesel-electric boat program. In addition, the country is keen to develop a nuclear submarine fleet, and the IN plans to acquire its own nuclear-powered submarines – both hunter-attack (SSN) and ballistic missile-carrying (SSBN). In 2009, the IN launched its first SSBN, the *Arihant*, and it was officially commissioned in 2016. The IN plans to ultimately deploy a fleet of four SSBNs, armed with the indigenously developed *Sagarika* submarine-launched ballistic missile. An indigenous class of SSN is also planned.²⁹

More importantly, India is putting considerable resources into building a carrier-centered navy.³⁰ After considerable delays, it is finally in the process of phasing out its two aging British-built carriers with both imported and home-grown replacements. In the first place, the IN has acquired the Soviet-built *Admiral Gorshkov*, a 45,000-ton *Kiev*-class carrier, decommissioned by the Russian Navy in 1996. In addition, India paid another US\$700 million toward the aircraft and weapons systems, which include 12 single-seat MiG-29K Fulcrum-D fighter jets, four dual-seat MiG-29KUB trainer aircraft, and six Kamov Ka-27 and Ka-31 helicopters, along with training, simulators, spare parts, and maintenance facilities. The carrier, renamed the INS *Vikramaditya*, was supposed to have been delivered to the Indian Navy in mid-2008, but refitting the vessel has turned out to be much more challenging than originally envisioned, resulting in considerable cost and delays. Eventually, however, the *Vikramaditya* was commissioned in late 2013, and it entered into service in 2014.

Even more ambitiously, the IN is acquiring two indigenously constructed aircraft carriers. The first of these, designated the INS *Vikrant*, is a 40,000-ton vessel and will utilize a similar STOBAR arrangement of ski-jump and arrestor wires. It will carry either the MiG-29K or India's indigenous *Tejas* light combat aircraft; as with the *Vikramaditya*, it will likely operate up to 26 fixed-wing fighters. Construction began in 2005 at the Cochin shipyards, but production problems have delayed the first *Vikrant*'s in-service date by several years, which is now not expected until 2021, at the earliest. A second indigenous carrier, the INS *Vishal*, is currently in the planning stages; it will be a true supercarrier, displacing 65,000 tons, utilizing a catapult-assisted launch system, and carrying up to 55 aircraft.

Ultimately, the IN wants to operate a three-carrier battle group force – one on each coast – with one in reserve. Such moves are still seen mainly as defensive; India cannot prevent Chinese warships from entering and operating in the IOR. On other hand, it is seeking to meet and compete with China when it comes to throwing down markers in establishing naval access points.

The US military in the Eastern IOR

The eastern IOR is not simply a Sino-Indian domain. The presence of other actors must be factored in. Chief among these is the continuing presence and activities of the US Navy, which operates in the eastern IOR through the Seventh Fleet (based at Yokosuka, Japan). The Seventh Fleet is the largest of the forwardly deployed numbered fleets, with approximately 70–80 warships (including at least one aircraft carrier), 140 aircraft, and 40,000 sailors and Marines.³¹ Major bases are in Japan and Guam, as well as Singapore (which has agreed to host up to four USN Littoral Combat Ships).

Most critical to the eastern IOR, the USN operates a Naval Support Facility at Diego Garcia. Diego Garcia is the only inhabited island found in the British Indian Ocean Territory, an overseas territory of the United Kingdom (UK) created in 1965. It is located just south of the equator in the central Indian Ocean, and it is the largest of 60 small islands comprising the Chagos Archipelago. It is more than 1,000 miles from any continent. Britain has permitted the United States to use Diego Garcia as a military base since the mid-1960s, and most of the infrastructure on the island, including the airfield, was built by the US military.

Diego Garcia is home to approximately 3,000 to 5,000 US military personnel and civilians, and it provides logistical support to forwardly deployed forces in the Indian Ocean and Persian Gulf areas.³² Facilities on the island include a port for a US Navy support force, a flotilla of Navy prepositioning ships holding US Army and US Marine Corps equipment, barracks, an airfield with two runways, as well as separate US Air Force detachments for supporting the Pacific Air Force and Air Mobility Commands.³³

The island is home to the Naval Support Facility Diego Garcia. In particular, the island's deep-water port harbors the United States Marine Pre-positioning Squadron Two, which comprises a number of large ships carrying equipment and supplies (including tanks and armored vehicles) to support a Marine Air-Ground Task Force for up to 30 days. Diego Garcia's naval base can also accommodate aircraft carriers and submarines, if needed.

Diego Garcia is one of two critical US Air Force (USAF) bomber bases in the Asia Pacific region, along with Anderson Air Base, located in Guam. Its airbase frequently hosts combat aircraft and transport planes from Anderson's 36th Wing. In particular, its two-mile runway permits B-1, B-2, and B-52 bombers to operate from the island. Other USAF facilities on Diego Garcia include a satellite remote tracking station, a US space surveillance facility, and a High Frequency Global Communications System transceiver site. Diego Garcia was also designated as an emergency landing site for the US Space Shuttle.

Due to its geographic location, Diego Garcia is the US military's most important base in the IOR. Its position makes it possible for the United States to project military power northwest toward the Persian Gulf, Middle East, and South Asia, west into Africa, and eastward into Asia. Consequently, the base has frequently served as a strategic launching pad for US military operations in the

Indian Ocean, and B-1, B-2, and B-52 bombers have frequently deployed to the island. The USAF used Diego Garcia as a base for long-range bombers to attack targets in Iraq during the first Gulf War (1991). Long-range B-52 bombers launched from the island bombed Taliban and Al-Qaeda positions in Afghanistan in the wake of the 9/11 attacks, and the base also served as a bomber base for operations against Iraq during the 2003 invasion. Diego Garcia is also an important refueling station for USAF aircraft.³⁴

Diego Garcia is critical to US efforts to blunt encroachment into the IOR by Chinese military forces. In particular, it would be instrumental in countering PLAN naval operations, especially aircraft carriers. According to a US Naval War College researcher,

American seapower requires a robust constellation of bases to support global power projection. Given the rise of China and the emergence of the Asia-Pacific as the center of global economic growth and strategic contention, nowhere is American access more important than [the IOR].

As such, the US military base at Diego Garcia aids

an offshore balancing posture that maintains local preeminence via control of the sea.... [A]ir and naval platforms, as well as rapidly deployable special operations forces, staged “over the horizon” at Diego Garcia, can enable the U.S. to pursue its regional interests with a less provocative and less visible presence.³⁵

The US military’s current situation on Diego Garcia is challenged by a recent ruling by the International Court of Justice that Britain’s control of Chagos – and its expulsion of indigenous peoples from the archipelago in the 1960s – was illegal, and that the UK must return the islands to the Chagossians. This ruling was subsequently upheld in a 116–6 vote in the United Nations General Assembly. These decisions will likely put pressure on the UK and the United States to remove US forces on the island.³⁶

Other players in the Eastern IOR

Several Southeast Asian nations – particularly Myanmar, Thailand, and Malaysia – also flank the eastern IOR. Despite being more of a land power, Thailand has considerable maritime interests, including the protection of offshore oil and gas reserves, counter-terrorism, counter-piracy, and countering illegal trafficking in its territorial waters.³⁷ The Royal Thai Navy (RTN), therefore, has considerable responsibility for providing littoral, EEZ, and blue-water maritime security. In recent years, the RTN has acquired two new frigates from South Korea, missile-carrying offshore patrol vessels from China, and one Endurance-class amphibious ship from Singapore, as well as helicopters and refurbished maritime patrol aircraft. The RTN has also long expressed interest in acquiring submarines; in 2017,

Bangkok ordered three *Yuan*-class submarines from China, in a deal worth around US\$1 billion.

It is worth noting that the RTN operates the only aircraft carrier in the region, the 10,000-ton, Spanish-built *Chakri Nareubet*, which was originally outfitted with nine used AV-8A *Harrier* jump jets, although it is believed that these fixed-wing aircraft are no longer operational. As such, the *Chakri Nareubet* operates mainly as a helicopter-carrier and is intended for antisubmarine warfare during wartime and disaster relief during peacetime. Since the *Chakri Nareubet* was delivered to the RTN in the late 1990s, however, it has spent most of its time in port, due to its high operating costs (although it was employed during the 2004 tsunami disaster and other relief efforts).

Myanmar traditionally possessed only a small navy, comprised mainly of patrol craft and corvettes, mostly of Chinese origin. In recent years, the country has aggressively built up its naval forces, adding two Chinese-built Type-053H1 frigates and three locally built frigates (outfitted with Chinese, European, and Russian missiles, helicopters, and electronics). Myanmar is also building several corvettes and missile boats at domestic shipyards, most likely with considerable Chinese assistance and technology.

Myanmar has lately become a prize fought over by both Beijing and New Delhi. In the past, Myanmar has been perceived as being firmly within the Chinese orbit, a critical link in Beijing's "string of pearls." It has permitted the PLAN ships access to Myanmar bases, and Myanmar has been a major buyer Chinese weaponry. However, in recent years India has made progress in eroding Beijing's influence. As previously noted, India and Myanmar recently agreed to permit India to operate the Myanmar port at Sittwe. In addition, New Delhi has agreed to construct a major highway connecting India, Myanmar, and Thailand.³⁸ These efforts have made major inroads to countering China's Belt-and-Road Initiative.

For their part, the Malaysian Armed Forces (MAF) have been transitioning from a counter-insurgency force to a more conventional one since the late 1980s. This process is driven by new security requirements, including the protection of EEZs in surrounding waters, safeguarding the Malacca Straits from terrorism and piracy, and growing concerns over heightened Chinese military activities in the South China Sea. Kuala Lumpur is placing greater emphasis on increasing capabilities in the area of firepower and force projection, joint-service operations, and long-range surveillance and intelligence. In this regard, in 2005, Malaysia established a coast guard – the Malaysian Maritime Enforcement Agency (MMEA) – which is tasked with patrolling Malaysia's maritime waters (including the Malacca Straits) and EEZs.

Kuala Lumpur has recently taken delivery of two Franco-Spanish *Scorpène*-class submarines for the Royal Malaysian Navy (RMN), both of which were commissioned in 2009. Other recent RMN acquisitions include six German-designed MEKO A100 offshore patrol vessels (OPVs) and six Littoral Combat Ships, based on the French *Gowind*-class corvette, which will be built locally by the Boustead Naval Shipyard in Perak. Kuala Lumpur is also working with

China to produce a 780-ton Littoral Mission Ship (LMS) for the Malaysian navy; the first four LMS ships will be constructed in China, while later vessels will be built in Malaysia.

As a recent report by the US Congressional Research Service (CRS) put it:

Some IOR states appear to be hedging against China's rising power by building their defense capabilities and partnerships, while others utilize more accommodative strategies with China or employ a mix of both. Some also see an opportunity to balance India's influence in the region. Hedging strategies by Asian states include increasing intra-Asian strategic ties, as well as seeking to enhance ties with the United States.³⁹

Other factors in the Eastern IOR affecting the regional security environment

A variety of other factors, separate from military-strategic dynamics, affect the security environment in the eastern IOR. Trade, development, and human rights all significantly challenge security, peace, stability, and cooperation in the region. In the first place, the IOR is a critical sea-line of communication between Asia and Europe, Africa, and the Middle East. The aforementioned CRS report observes that the IOR is "a key geostrategic space linking the energy-rich nations of the Middle East with economically vibrant Asia."⁴⁰ Perhaps one-quarter of the world's trade passes through the eastern IOR into the Strait of Malacca. Middle East oil and gas shipments to East Asia especially depend on this SLOC.

Not surprisingly, therefore, China's Belt-and-Road Initiative is strategically vital for both economic and military reasons. The Strait of Malacca constitutes a critical – and nearly unavoidable – chokepoint for Chinese trade, shipping, and naval transit into the IOR. In turn, the strait constitutes a crucial conduit for traffic in a region that is increasingly an arena for great power rivalries. It is not simply a matter of trade, although trade *is* important, as commerce – and therefore commercial shipping – has become more important. This is especially true for the two largest aspiring great powers, India and China, who have joined the global economy with a tremendous ferocity over the past 20 years.

In this respect, therefore, commerce and great power aspirations go hand in hand. China's ambitious and aggressive BRI is a scheme to dominate transportation and trade between Asia and Europe/Africa, and to therefore also increase its political influence in Central Asia, the Middle East, and Europe. Since these trade routes still rely heavily on the eastern IOR, its significance when it comes to global geo-economics and geopolitics is self-evident.⁴¹

Economics have also become an important tool in Indian and Chinese efforts to woo the support of nations bordering on the eastern IOR. Bangladesh, the Maldives, Myanmar, the Seychelles, and Sri Lanka have all manipulated Sino-Indian rivalries to their advantage, securing trade deals, investments, construction projects, and even armaments.⁴² Myanmar, for example, got an oil pipeline from China and a major road construction project from India.

On the other hand, regional human rights predicaments may come to complicate the Sino-Indian rivalry in the eastern IOR. The plight of the Rohingya Muslim/Hindu ethnic minority in Myanmar has been the most visible. Most had been living in the western state of Rakhine. For years, the Myanmar government had effectively engaged in “institutionalized discrimination” against the Rohingya, restricting marriage, family planning, employment, education, religious choice, and freedom of movement.⁴³ In 2017, however, clashes broke out between ethnic Myanmar (who are mostly Buddhist) and Rohingya groups, leading Myanmar’s security forces to initiate brutal ethnic cleansings against the Rohingya. Thousands have been killed or subjected to other brutalities (including rape and sexual slavery), and tens of thousands more were herded into internal confinement camps or forced to flee the country. More than 1.3 million Rohingya now live in refugee camps in Bangladesh, and another 150,000 are in Malaysia.

Given Chinese and Indian desires to woo Myanmar into their respective camps, both Beijing and New Delhi have been muted in their criticisms of the Myanmar government. China is focused on securing trade and energy infrastructure investments, and as such Beijing has even expressed support for Myanmar’s “efforts to uphold peace and stability” in Rakhine state.⁴⁴ India’s interest in countering Chinese influence in Myanmar has caused it to also play down the Rohingya crisis.⁴⁵

Conclusion

According to the US intelligence community’s 2019 *Worldwide Threat Report*, as Chinese military power has grown, so too has its global footprint:

The People’s Liberation Army (PLA) continues to develop and field advanced weapons and hardware while honing its ability to fight in all military domains. The force is undergoing its most comprehensive restructuring ever to realize China’s long-held goal of being able to conduct modern, rapid military operations based on high technology to assert and defend China’s regional and growing global interests. ... As China’s global footprint and international interests have grown, its military modernization program has become more focused on investments and infrastructure to support a range of missions beyond China’s periphery, including a growing emphasis on the maritime domains, offensive air operations, and long-distance mobility operations.⁴⁶

For decades, Chinese force projection has been described as a process of moving from the “first island chain” – an area of the Pacific Ocean running from the Japanese islands down past Taiwan and the Philippines to the Indonesian archipelago, i.e., roughly encompassing the East and South China Seas – to the “second island chain,” i.e., those waters extending out into the Philippine Sea as far as Guam and the Northern Mariana Islands. Certainly this is where the Chinese military – mostly the PLAN – is the most militarily present and powerful. But it is also

apparent that Chinese ambitions are no longer bound by the western Pacific. Its expanding economic interests in the Indian Ocean have in turn made the IOR an increasingly vital domain. This has created new challenges for the PLAN, that is, the requirement to project sizable *and sustainable* power far from China's home waters. It is still not there yet, but it seems self-apparent that the Chinese have a plan for achieving this goal.

China's intrusion into the Indian Ocean is creating a new set of security challenges and power reconfigurations in the eastern IOR. It has, for example, opened up a new front in the Sino-Indian strategic competition. India's "proprietary feelings" about the Indian Ocean and its sense that the IOR is its "rightful nautical preserve" have already left New Delhi sensitive enough about new powers intruding into these waters. What is more, China's growing presence in the IOR appears to be both enduring and zero-sum, that is, aimed at lessening India's clout in the region.

China's expanding attendance and role in the Indian Ocean also complicates the role and impact of US power in the IOR as a whole, and it injects a whole new variable in how other countries contiguous to the eastern IOR – Sri Lanka, Myanmar, Thailand, etc. – will have to approach regional security. Moreover, China's seeming permanence in the Indian Ocean promises to complicate security-building and regional problem-solving in the eastern IOR (for example, the obstacles placed on efforts to resolve the Rohingya crisis).

Complicating these developments and injecting a more ominous undertone to this unfolding regional security calculus is the fact that military power is increasingly becoming a vital tool for determining influence and control in the IOR. In other words, it is not just economics or trade or diplomacy. To be sure, raw military power has always played a role in regional security, but with the increasing presence of Chinese economic and political power in the IOR, the further injection of Chinese military might – which is growing both qualitatively and quantitatively in the region – is a new variable. This will likely prompt other countries to follow suit, making the strategic situation in the eastern IOR increasingly a militarily influenced state. Consequently, how military power in the eastern IOR evolves and is utilized should be of growing concern.

Notes

- 1 [Name redacted], 2018, p. ii.
- 2 [Name redacted], 2018, p. ii.
- 3 Holmes, 2016.
- 4 Zhang, 2016.
- 5 Holmes, 2016.
- 6 Holmes, 2016.
- 7 Holmes, 2016.
- 8 Holmes, 2016.
- 9 Zhang, 2016.
- 10 Pejic, 2016; Chansoria, 2017.
- 11 Baker, 2015.
- 12 Kynge et al., 2017.

- 13 State Council Information Office, "Section II: Missions and Strategic Tasks of China's Armed Forces," 2015.
- 14 State Council Information Office, "Section IV: Building and Development of China's Armed Forces," 2015.
- 15 Office of the Secretary of Defense, 2006, p. i.
- 16 [Name redacted], 2018, p. 11.
- 17 [Name redacted], 2018, pp. 30–33.
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11 India

Harish Masand

Due to its unique geographical position and historical legacy, India faces a complex security environment that spans the full spectrum of conflict from nuclear to sub-conventional war, and the possibility of a two- to three-front war. Apart from cross-border terrorism and growing radicalization in its immediate and extended neighborhood, India's security landscape is challenged by the unresolved border disputes with China and over Jammu and Kashmir (J&K) with Pakistan, despite the accession of the state to India soon after independence, wherein a large portion of the state is still occupied by Pakistan. Between these two traditional rivals, China is becoming more unpredictable for India's security calculus.

China's increasing military activism under its President for life, Xi Jinping, is also of particular concern to India. In the last decade or so, China has carried out major structural reforms in the PLA along with a major modernization program supported by an unprecedented increase in military spending which has made it the second largest military spender in the world. China's aspirations toward global leadership and regional domination are well known. Its aggressive moves in the South China Sea with increasing militarization of claimed islands and regular incursions across the line of actual control into India, including 2017's 73-day stand-off in Doklam, have been on the rise. Coupled with this, its growing military encirclement of India, on land as well as "the string of pearls"¹ in the Indian Ocean Region, poses a growing security challenge to India.

At the same time, China continues to support Pakistan, politically, militarily, and economically, to keep India boxed-in in South Asia without being seen as confronting India directly.² Being unable to militarily defeat India and wrest J&K from India in three major conflicts starting soon after independence in 1947 and, later, in 1965 as well as 1971, Pakistan adopted the low-cost strategy of a "thousand cuts" against India encouraging and supporting terrorist groups toward infiltration and terrorist attacks in J&K as well as other parts of India.³ While India was able to quell the Khalistani movement in Punjab in the 1980s and has been able to keep the situation in J&K under control despite Pakistan's attempts to destabilize the state in this Low Intensity Conflict (LIC), it is the possibility of a two-front war with both China and Pakistan, acting in collusion,

that occupies the minds of military strategists in India. With growing presence and capabilities of modernized maritime forces of the PLA Navy, this may well turn out to be three-front problem for India in the future.

While major territorial incursions and gains with long-term occupation of territory may not be geopolitically sustainable in today's international environment, the possibility of limited engagements on all three fronts simultaneously cannot be entirely ruled out. This possibility tends to tie down Indian forces on all fronts and adversely impacts the Indian capability to deter any misadventure. Out of these, the possibility of an engagement through miscalculation or misunderstanding through ambiguous situations, particularly in the maritime domain, as indicated by the INS *Airavat* incident of 2011, remains the greatest for which India needs to prepare in the near-term itself. Even though the security challenges for India have been progressively growing, budgetary constraints and the focus on economic development in the last two decades have adversely affected modernization of the armed forces and force levels, particularly of the Air Force and Navy. This has resulted in nullifying the technological superiority the Indian armed forces traditionally enjoyed, particularly in the maritime domain, over its adversaries in the region till the last decade, adversely affecting the deterrence that has, perhaps, been responsible for preventing a major conflict in the region for almost four decades.

Because of the objectives of this chapter and constraints on space, it is not intended to go into details of the historical context and the 1962 conflict with China. Suffice here to state that while China has settled its boundary with all of its South Asian neighbors based on the watershed principle and the McMahon line, it has refused to do so with India. China continues to occupy a large chunk of the state of J&K in the Aksai Chin and Ladakh areas while progressively staking a claim to the entire state of Arunachal Pradesh in the East, as also some other smaller areas in the North, to keep India off-guard and under threat. Being in occupation and as a stronger military power, China has shown little serious intent to resolve the boundary issue with India.⁴ The Chinese have also been adept at slow and progressive occupation of claimed territory in what the first Prime Minister of India, Pandit Jawahar Lal Nehru, as early as in the 1950s, referred to as China's concept of "mobile frontiers."⁵ Later, this has also been termed the "salami slicing" strategy. Such a strategy has recently been evident even in the South China Sea wherein China has made creeping, transformative encroachments and militarization without firing a single shot. This reportedly resulted in the comment by US Commander in Chief, Pacific Fleet (CINCPAC) that "China is now capable of controlling the South China Sea in all scenarios short of war with the US."⁶

While the security challenges emerging from the existing geopolitical situation in the North, North-East, and the West continue to trouble India, India is in a unique geographical position in the Indian Ocean Region (IOR) with a vast coastline and its southern peninsula jutting out into the Indian Ocean with the Arabian Sea to the West and the Bay of Bengal to the East. In the words of KM Pannikar,

The vital feature which differentiates the Indian Ocean from the Atlantic or the Pacific is the sub-continent of India, which juts out far into the sea for a thousand miles. It is the geographical position of India that changes the character of the Indian Ocean....⁷

This puts India astride the Sea Lines of Communications (SLOCs) where a large amount of trade between Africa, Middle East and Southeast Asia, as well as China, passes. Some 80 percent of the world's maritime oil trade flows through the choke points in the Indian Ocean.⁸ The island territories of Andaman & Nicobar overlook the choke points for these SLOCs in the East and give India a unique geographical advantage to dominate these SLOCs and make traffic and trade difficult on these routes for hostile powers. Unfortunately, India has not truly capitalized on this unique geographical advantage in terms of its political and economic aspirations. It has also not really developed these island territories as strategic bases, largely due to tribal affairs and environmental controversies.⁹

China's rapid military modernization on all fronts and flexing of its military muscle in tandem with the phenomenal economic growth sustained over almost the last three decades have quite obviously and naturally raised the security concerns with grave implications in the foreseeable future, not only for India but for most countries in the Indo-Pacific region, including the US. China today is the second largest military spender in the world with an acknowledged budget of US\$175 billion for 2017, which signifies a little over 8 percent increase from the previous year, with additional funds from the PLA's business enterprises which do not get accounted for in the officially released budget. For example, for 2017, SIPRI estimated that China's annual military spending was actually \$228 billion, or around 2.3 percent of the GDP.¹⁰ As against this, India declared a defense budget of just Rs2,955.1141 billion (or US\$42 billion at the current rate of exchange of Rs70 to 1 US\$) for FY 2018–19, at 1.58 percent of its GDP.¹¹

The current geopolitical situation in the Indo-Pacific now also sees both China and India jostling for friends and bases, China perhaps being ahead in this game with more resources due to its economic might and rapid modernization of its naval and air elements. After it sufficiently builds up its maritime forces, an engagement with India in the maritime domain may well become some sort of a dress rehearsal for China toward its eventual aim of becoming a global player and ousting the US as the dominant power in the Indo-Pacific, apart from humiliating India as in 1962, particularly if India tries to assert itself. Such a possibility brings into sharp focus the comparative capabilities of maritime forces of the likely adversaries, and specially their air power. This chapter would deal with air power of India in that context without specific comparisons with the likely adversaries.

Indian Air Force

The Indian Air Force (IAF) officially came into being on 8 October 1932 with just a flight of Wapiti aircraft in 1933. From such humble beginnings, it was built up to a force of ten fighter-bomber squadrons during World War II due to

the sheer necessity of holding the Japanese advance toward India from Indo-China with tactical tasks of reconnaissance, close air support, and interdiction. This tactical orientation is noteworthy since even after independence and bifurcation of this limited force between India and Pakistan, both air forces remained largely focused on tactical missions and aircraft for a long time, with minor exceptions to induct bomber aircraft like the refurbished B-24 Liberators and later the Canberra in the 1950s and the Jaguar as a Deep Penetration Strike aircraft in the late 1970s in India as well as the American counterpart B-57 in Pakistan not counted. For the IAF, this state continued almost till the induction of the Su-30 in the IAF in 1997 along with other combat support elements to increase its reach.

Immediately after independence, the IAF was to be flung into combat with its limited force of six fighter squadrons, mainly of Tempest and Spitfires, and a flight of Dakotas, in the first war for Kashmir from October 1947 till January 1949. Led by veterans of the Burma Campaign, its stout performance certainly played a major part in saving the vale of J&K and Ladakh for India.¹²

Soon, the IAF became the first air arm in Asia to operate jet fighters with the induction of the early versions of the Vampire in November 1948. Considering the security scenario at that time with worsening relations with Pakistan, the plan in the 1950s was to rapidly modernize and raise the IAF strength from 15 squadrons to 33 squadrons. This led to the induction of the French Ouragans and Mystere, Hawker Hunter, English Electric Canberra, the first lightweight fighter Gnat from the UK, and the C-119G Packet transport aircraft from the US in that decade. At this time, the Soviet Union also became an attractive source of supply due to its reliability and, particularly, its pricing and payment terms. These considerations resulted in induction of the AN-12 and IL-14 transport aircraft and also the Mi-4 helicopter to replace and supplement the existing few Sikorsky S-56s and Bell 47G helicopters.

Concurrently, with the induction of the F-104 Starfighter in the Pakistan Air Force, an initial order for 12 MiG-21s was placed, being the first combat, and supersonic, aircraft from the Soviet Union, which were inducted in 1963. This move of acquiring Soviet combat aircraft was to have a profound effect on the complexion and strength of the Indian Air Force in the future with a major portion of the Air Force becoming of Soviet origin, many produced under license in India. Almost 600 MiG-21 variants were to be produced under license in the nearly 1,000 MiG-21s operated by the IAF¹³ with the last six squadrons of the upgraded MiG-21Bis, or Bison as they are called, still in service. In the late 1960s, a few squadrons were also equipped with the Su-7 in the ground attack role.

At the time of the Chinese invasion in 1962, the IAF had about 21 combat squadrons, many with old and outdated aircraft but, overall, with some useful combat potential. Unfortunately, due to a number of reasons, the combat element was not employed in this conflict and the IAF was restricted to air lift and Cas-evac through its limited transport and helicopter fleet. Despite limitations on its capabilities in higher regions of the Himalayas, this herculean task of

supporting the Army was performed with commendable zeal as well as innovation by the IAF.¹⁴

In the wake of the humiliating defeat at the hands of the Chinese in October–November 1962, a decision was taken to increase the sanctioned strength of the IAF to 45 combat squadrons though the projected requirement was for a force of 64 squadrons by the Tata Committee.¹⁵ That level was never sanctioned or achieved and the IAF, at best, reached the strength of 42 combat squadrons largely due to budgetary constraints.

Even while the IAF was in the process of rapid expansion and not quite prepared, it was thrust into a full-fledged war due to Operation Gibraltar launched by Pakistan to grab Kashmir in 1965. While it may not have fared as well as could be expected and lost some 36 aircraft on the ground, the IAF did hold its own and took away some important lessons which were to stand it in good stead in the next round. Overall, with the 1 : 1.5 ratio in strength in its favor, the IAF fared better with a higher utilization rate and lower attrition rate, if one discounts the losses on the ground.¹⁶

The next round came in 1971, which has been well described as the IAF's finest hour with complete air superiority in the Eastern Sector in two days leading to the liberation of Bangladesh in barely two weeks with over 93,000 Pakistani prisoners of war.¹⁷ This was, perhaps, also the time when the IAF started to change its outlook from a tactical perspective and many leading proponents, Jasjit Singh being the lead one, of air power began talking of a force with a larger reach and punch with a focus on air superiority. The attack on Karachi harbor with its oil installations in the opening shot and the precision attacks on Government House in Dhaka, with unguided weapons but without any collateral damage, in the closing stage of the 1971 war were manifestations of such an outlook. The IAF's role in the humanitarian assistance provided in Sri Lanka with supply drops in 1986 and operations in Maldives of 1988 are some examples of the growing capabilities and changed thinking in the IAF.

The modernization and expansion of the IAF was to reach a peak in the aftermath of the 1971 war with induction of a multitude of aircraft, systems, and institutions for professional training. The multitude of types, welcomed due to their specialized roles and increased capabilities while maintaining reliability of supply and sustenance, was also to become a problem in terms of logistics and maintenance, which continue to trouble it till today. The various types of combat aircraft inducted in the 1970–80s included two types of license-produced MiG-21s, the M and Bis versions, the MiG-23MF, BN, and finally the MiG-27M/ML and the Anglo-French Jaguar, both license-produced in numbers. 1985 saw the induction of two squadrons of the French Mirage-2000 multi-role aircraft and starting in 1987, three squadrons of the MiG-29 in the air superiority role.

In 1996, India opted for the twin-seat Su-30 with the first squadron of the initial Su-30K being inducted in mid-1997. Soon, this program was to lead to license manufacture of the Su-30 in the MKI version with progressively increasing numbers with the total number currently reaching 272 aircraft. Ten squadrons of

the Su-30s are already in service with the number expected to reach about 14 squadrons.

The formulation of the first formal doctrine of the IAF in 1995 came under the leadership of then Air Chief Marshal SK Kaul. In this document, the shift from purely tactical roles to more strategic ones, in keeping with the growing regional responsibilities and power projection roles of the Indian Air Force, is quite evident.¹⁸ The shift in doctrinal outlook also resulted in the Indian Air Force pursuing combat support systems like Air-to-Air Refueling (AAR), Airborne Early Warning and Control Systems (AWACS/AEW&C), Electronic Warfare (EW), and digital information sharing systems. Such regional aspirations and thinking were also, perhaps, spurred by economic liberalization, which came in the wake of an economic crisis in India in the early 1990s, and the consequent rise in GDP growth to healthy single digit figures.

Around this time, the IAF started looking for upgrades to its existing combat platforms and life-extensions, starting with the MiG-21Bis in 1993 due to delays in the indigenous Light Combat Aircraft (LCA) program. Such an approach was to set a precedent for future upgrades which led to avionics upgrades for the existing Jaguars and MiG-27s at the turn of the millennium with the MiG-29 following a few years later and the Mirage 2000 in the current decade.

In 1999, the IAF was, once again, to show its mettle in the limited but strategically significant conflict with Pakistan in Kargil. Unlike in 1962, this time the IAF's combat element was immediately employed to provide close support to the Army in its efforts to evict the Pakistani intruders which had occupied crucial heights across the Line of Control (LoC) while ensuring that the conflict did not escalate into a full-fledged war by not crossing the LoC.¹⁹

As Pushpinder Singh put it while compiling the history of the Indian Air Force during its 75th anniversary in 2007, "there has been a paradigm transformation of the Indian Air Force over the past three decades, even as the nation itself has set about charting its political and economic future with renewed confidence" and

Many of these (aircraft, weapons, radar and communication equipment received earlier) will continue in service well into the 21 century even as the IAF is inexorably being transformed into becoming an "Aerospace Force." The last few years have seen the IAF receiving force multipliers in the shape of air dominance fighters, in-flight refueling aircraft and shortly the airborne warning and control system AWACS, to be complemented by aerostats, UAVs and surveillance satellites in near space which will not only give the IAF a global reach but also fulfill its destined role in the region far beyond (the) geographical limits of the subcontinent.²⁰

In keeping with such a vision, a lot of debates and questions were raised, even at parliamentary level, on formation of an Aerospace Command, the first step toward which resulted in the formation of a directorate in Air HQ under an Assistant Chief of Air Staff Operations (Space), a two star officer.²¹

The revised IAF doctrine of 2012 makes such a vision abundantly clear even though an Aerospace Command has not yet been formed due to a variety of reasons at the governmental level. The Vision Statement of the revised doctrine states “To acquire strategic reach and capabilities across the spectrum of conflict that serve the ends of military diplomacy, nation building and enable force projection within India’s strategic area of influence” while the Mission Statement is “To be a modern, flexible and professional aerospace power with full-spectrum capability to protect and further national interests and objectives.”²²

Unfortunately, despite such doctrinal emphasis on being an aerospace power with strategic capability for force projection in the region, the IAF today finds itself operating at less than three quarters of its sanctioned strength in effective combat squadrons. The IAF currently operates ten squadrons of the heavy-weight multi-role Su-30MKIs, three squadrons each of the MiG-29 and Mirage 2000s, all almost upgraded, six squadrons of the upgraded MiG-21 Bison, five squadrons of the Jaguar with another half squadron in the maritime strike role, two squadrons of the upgraded MiG-27, and the first squadron of the Light Combat Aircraft (LCA) Tejas at half strength. This brings the total number of squadrons to 30. In addition, it continues to operate five squadrons of the MiG-21M/MF version, one squadron of the non-upgraded MiG-21Bis, and two and half squadrons of the MiG-27ML aircraft.²³ All these eight and a half squadrons have limited capabilities in a modern battlefield and, in any event, are likely to be phased out soon due to expiration of their service lives and the dwindling product support.

Even the six squadrons of the upgraded MiG-21Bisons are nearing the end of their calendar life starting in 2018. However, considering the lack of adequate replacements, it is likely that a way would be found to keep some of these squadrons operational, considering their extended service life. Thus, some of the Bison squadrons could be expected to be in service till mid-2020s. The existing five and a half squadrons of Jaguars are due for another upgrade, including new engines, which would give them the capability to operate effectively for another decade or so considering their residual service life. Deliveries of the 36 Dassault Rafale commence in October 2019 and the first four aircraft with trained crew are expected to arrive in India in May 2020. This aircraft would generate two additional squadrons. In February 2019, another 21 MiG-29s were also ordered to stem the declining combat strength of the IAF. The planned induction of the 272 Su-30MKIs would also add another four squadrons in the near future. In addition, a total of 126 LCA Tejas Mk1 are currently planned for induction, which will translate into another six squadrons. This number may increase further. A Request For Information (RFI) has also been issued for 110 multi-role fighters. However, considering the procurement system, it is unlikely that these aircraft would come anytime soon. All in all, it could be reasonably expected that the IAF would continue to operate with an effective strength of 30 to 35 combat squadrons in the next decade.

The IAF has plans of building up its strength to 42 combat squadrons by 2032 but, with the current state of affairs, this target is highly unlikely to be met

unless some urgent measures are taken to make up the shortfall. While this state of affairs has come about largely due to budgetary constraints despite a growing economy, with the political focus on fiscal deficit, infrastructure development, and poverty alleviation programs, a significant problem also has been the dysfunctional defense procurement system which has prevented timely acquisition of much needed assets for the armed forces.

A major example of the muddled procurement process in the context of the Air Force has been the delays, and finally cancellation, in the 126 Medium Multi-Role Combat Aircraft (MMRCA) program wherein the requirement was first mooted in 2001. However, the formal Request For Proposal (RFP) was issued only in 2007 permitting six different aircraft, both single-engine and twin-engine in a wide price range, to compete. After extensive field evaluations, the Eurofighter Typhoon and Dassault Rafale qualified out of which the Rafale was selected as the lowest commercial bidder in 2012, albeit with a huge escalation in the program cost.²⁴ Finally, after prolonged negotiations, the program was canceled in 2015 due to wrangling over transfer of technology and quality assurance, of the 108 aircraft to be locally produced, by Dassault but also, perhaps, unaffordable escalated costs.²⁵

The new Narendra Modi led Government, elected in 2014, signed a Government-to-Government (G2G) contract with France for direct supply of 36 Rafale aircraft in September 2016, looking at the depleting strength of the IAF. In the interim, to highlight the difficulties in the procurement process in India, even this contract for 36 Rafales has raised a political storm in India with the opposition parties making a number of allegations.²⁶

Another significant issue that plagues the procurement process and timely acquisition of required assets for the armed forces in India has been the lack of adequate indigenous capability due to the failure of its Government-owned Defence Research & Development Organisation (DRDO), public sector manufacturing units like Hindustan Aeronautics limited (HAL), and ordinance factories to design and produce the required weapons in time, to the standards required and at competitive costs. An example of this is the LCA program, which was sanctioned in the mid-1980s as an aircraft to replace the large number of MiG-21s facing life-expiry starting from the turn of the century. However, this program has also faced cost and time overruns and the LCA is still to enter service in the specified operational standards and the required numbers. Regarding costs, while defending the decision of the Government on the Rafale, the Defence Minister, Ms Nirmala Sitharaman stated on TV in January 2019 that a Su-30 built by HAL cost 45 percent more than one imported from Russia.²⁷ An indigenous industry, which could meet a large portion of the requirements of the armed forces in time and stipulated costs, would certainly ease the problem. Hopefully, the “Make in India” focus of the current Government would yield some results in these areas in future.

Even in terms of fifth generation aircraft, the IAF lags far behind China. In 2005, both the Mikoyan and Sukhoi design bureaus presented their plans to jointly develop the Fifth Generation Fighter Aircraft (FGFA) to the IAF. Both

design bureaus desperately needed Indian funding at that time. The Government chose the Sukhoi route and invested its initial share of funds of US\$295 million after signing a bilateral agreement in 2007. The PAK-FA prototype flew soon after in 2010 confirming that Sukhoi had already done a lot of work on its own. Largely for reasons of the Russian reluctance on sharing of technical know-how and work, doubts on the actual capabilities and reliability of this aircraft apart from the fact that the PAK-FA design is for a single-seat aircraft while the Indian Air Force is more keen on a twin-seat version based on its experience on the Su-30MKI, this program is now doubtful despite many attempts to revive it even at the highest levels of government. The Russians made another offer in July 2016 to share the technical know-how but just three prototypes at US\$3.7 billion while asking for another US\$8 billion to develop a twin-seat version.²⁸ However, doubts on the extent of transfer of technology and costs remain and India reportedly conveyed its unwillingness to continue this partnership in July 2018.²⁹

At the same time, DRDO's plans to indigenously develop and produce the fifth generation Advanced Medium Combat Aircraft (AMCA) are unlikely to be successful, both qualitatively as well as in a realistic time-frame, due to the limited know-how and demonstrated existing ability on the LCA program to produce such an aircraft without substantial help in key technologies and systems from foreign partners. This is likely to further erode the qualitative superiority that the IAF had earlier enjoyed in this region, particularly with the likely induction of the J-20 and/or the J-31s in the PLA in the coming decade.

On the other hand, the IAF has made some progress in acquiring strategic reach and capabilities in keeping with its doctrinal emphasis and growing regional responsibilities. Toward this capability, it has already acquired six air refueling aircraft in the form of the multi-role IL-78 along with three AWACS with the Israeli Phalcon radar system mounted on an IL-76 platform. However, these are considered inadequate to meet the challenges from all three fronts. In addition, it has also acquired 11 C-17 Globemasters,³⁰ as well as ten C-130J Hercules from the US to supplement its existing transport fleet of about 17 IL-76, 102 An-32, 56 HS-748 Avros, and 35 Dornier 228 in addition to three Boeing Business Jets (BBJ) and four Embraer 135 customized for VIP duties.³¹

However, the limited numbers and diversification in the types of assets have intrinsic logistics and maintenance issues which could affect the ability to generate the required effort for prolonged durations from different locations. The IAF currently operates three AWACS, with two more likely to be ordered soon, and three smaller AEW&C aircraft on Embraer 145s, developed indigenously by DRDO. A plan to indigenously develop two more AWACS on the Airbus-330 was also approved in 2015 with likely delivery in 2024 with six more likely to be ordered later.³² Such different types, once again, indicate a muddled procurement process and problematic logistics.

In terms of its helicopter fleet, the IAF alone has over 400 helicopters operating in 21 units. These include a number of Mi-17s, with some also converted to the armed version, the Alouette III in the locally manufactured Cheetah and

Chetak versions and the indigenous ALH Dhruv. In addition, it has two units of Mi-25/35 armed helicopters dedicated to close support of land forces and three heavy-lift Mi-26s.³³ It is now in the process of replacing the Mi-26 with 15 Chinooks on order and the Mi-35s with 22 AH-64 Apaches. The number of Apaches is likely to increase by another 40 for the dedicated Army requirement.

Currently, while the emphasis in the IAF is essentially on combat aircraft, the transport and helicopter fleet of the Air Force is expected to grow further. The IAF can also call on the large fleet of domestic airlines in an emergency with over 650 aircraft operating a wide mix of wide-body and narrow-body jets as well as regional propeller aircraft with India currently being the third largest civil aviation market. The aircraft include the Airbus 320 series, Boeing 737, 747, 777 and 787, ATR-72, and Bombardier Dash 8.³⁴ The civil aircraft fleet size is expected to annually grow at double digit figures with Boeing in 2015 projecting 1740 aircraft over the next 20 years.³⁵ However, these aircraft would have their own limitations in terms of configuration, capacity, and availability in time.

In terms of munitions, particularly precision munitions against surface targets, the IAF uses a number of these with laser, TV, GPS, anti-radiation or TERCOM (Terrain Contour Matching) guidance or a combination of these. While the exact inventory is classified, these appear to have been procured from a variety of sources as also produced indigenously. Almost all of its combat aircraft are currently capable of carrying a variety of such weapons. Though the IAF is making efforts to increase its inventories of such munitions, it is felt that it will have to be more innovative in its approach with indigenous efforts to procure and stockpile adequate numbers at different locations, within the budgetary constraints, to rapidly meet contingency requirements in all possible scenarios.

In addition, the Army and the Navy have already inducted a number of the supersonic cruise missile Brahmos. This is currently a 3,000 kg fire-and-forget precision weapon operating at speeds of about Mach 3 at a standoff range of around 300 km and a conventional warhead of 250–300 kg with a 1 m CEP. Reportedly, the Army has already formed three regiments while the Navy had equipped eight warships with this missile and also tested a submarine launched version to equip most of its future submarines. In November 2017, the IAF successfully tested an air-launched version of this missile from a Su-30MKI. A lighter version of this missile called Brahmos NG (Next generation) is also under development for carriage by most medium-weight combat aircraft of the IAF and the Navy.³⁶ Other versions like Brahmos-II for hypersonic speeds of Mach 7 and Brahmos-ER (Extended Range) for stand off ranges of about 600 km are also under development.³⁷

In addition to this very potent weapon, the armed forces of India also have on their inventory different versions of the short-range tactical ballistic missile called “Prithvi” with a conventional warhead of between 500 and 1,000 kg and ranges from 150 to 750 km. With a strap-down inertial guidance system, this missile has a reported CEP of 50 m. A naval version called “Dhanush” has also completed tests.³⁸ The missile, perhaps with a nuclear warhead, is also with

India's Strategic Forces Command.³⁹ A more capable and accurate version, probably with some form of terminal guidance called "Prahara," was also test fired in September 2018.⁴⁰

Maritime air

The Indian Navy (IN) also has a reasonably potent air arm, which supplements and adds to the air power assets of India. From the very beginning since independence of the country in 1947, the IN has been cognizant of the importance of maritime power, perhaps emanating from the lessons of history whereby, with the decline of maritime power of Indian states from about the thirteenth century, the entire subcontinent slowly came under the subjugation of European powers, first the Portuguese followed by the British. On independence, the Royal Indian Navy had 32 aging ships fit essentially for coastal defense and about 11,000 personnel. Almost all of its senior officers were still British with the first Indian officer, Vice Admiral Kataria, taking command of the Indian Navy only on April 22, 1958, over eight years after India became a republic in 1950 and the prefix "Royal" being dropped.⁴¹

From the early years itself, the Navy was aware of the fact that the aviation component of the fleet was an invaluable tool for power projection and extending surveillance in the maritime area of interest. Toward this capability, it acquired ten amphibian Sealand aircraft as early as 1953⁴² and then became the only Navy in Asia to operate an aircraft carrier for many decades since the induction of its first and only carrier INS Vikrant, erstwhile HMS Hercules, from 1961. In 36 years of commendable service, including its role in the 1971 Indo-Pak war despite being a World War II design for the Royal Navy, the Vikrant operated a variety of aircraft including the Hawker Sea Hawk and Sea Harrier fighters, Breguet Alize' anti-submarine aircraft as well as Sea King Mk 42 and HAL-built Chetak helicopters, finally being decommissioned in 1997.⁴³ In between, India acquired another carrier, INS Viraat, erstwhile HMS Hermes from the UK, in 1987. This carrier had a ski jump for operation of the Sea Harrier in the STOL mode, could carry 750 troops with four landing craft for amphibious assault, and had good ASW capabilities. INS Viraat remained the flagship of the Indian Navy till INS Vikramaditya was inducted in 2013. Viraat was finally decommissioned in 2017 after almost 30 years of service in India in addition to 27 years with the Royal Navy.⁴⁴

Today, the IN operates a single aircraft carrier, INS Vikramaditya, the erstwhile Admiral Gorshkov from Russia refitted and modified to Indian requirements, with a ski jump for Short Take Off But Arrested Recovery (STOVAR) to convert this Kiev class cruiser-carrier to full carrier configuration. The Vikramaditya can operate 30 aircraft including MiG-29K fighters and Kamov Ka-31 AEW&C and Ka-28 ASW helicopters.⁴⁵ An Indigenous Aircraft Carrier (IAC-I), a 40,000-ton carrier, currently being outfitted at Cochin Shipyard, is expected to undergo sea trials in 2020. This would be named in honor of the first aircraft carrier as INS Vikrant. The Vikrant would be able to operate 30 aircraft. A third

65,000-ton carrier (IAC-II) is also being planned for delivery in 2030. By 2027, end of the erstwhile 14th plan, the Navy is expected to have close to 500 aircraft.⁴⁶

The Indian Maritime Doctrine also formalizes the thinking and experience of the IN since independence and emphasizes that “sea control is the central concept around which the Indian Navy is structured and aircraft carriers are decidedly the most substantial contributors to it.”⁴⁷ The Indian Maritime Security Strategy reiterates this concept and further states that

it is a key component of the strategy for conflict and a prerequisite for most naval operations. The Indian Navy will undertake the range of naval missions and tasks commensurate with the degree and duration of sea control required for execution of the operational plan. These will include developing MDA, power projection and force protection, in all dimensions, against the adversary

and that “balanced, multi-dimensional fleet is necessary for obtaining sea control beyond coastal waters” comprising of “the Carrier Task Force (CTF), consisting of Carrier Battle Group(s) (CBG) with integral Anti-Air Warfare (AAW), Anti-Surface Warfare (ASuW) and Anti-Submarine Warfare (ASW) capability, Surface Action Groups (SAG), and Underway Replenishment Groups (URG), supported by land-based aircraft.”⁴⁸ With its focus on Carrier Battle Groups, the IN is working towards three CBGs in the next decade to protect India’s maritime interests. This focus has sometimes been questioned with some arguing for a more flexible and distributed fleet architecture, particularly in view of budgetary constraints.⁴⁹

The IN currently operates a range of aircraft and helicopters in various roles in about 17 air squadrons comprising of eight on fixed-wing aircraft, eight on helicopters, and one on UAVs. The aircraft include 45 MiG-29K, 17 Hawk Mk 132 advanced trainers, 123 of which are also operated by the IAF, eight Boeing P-8I with four more to be delivered by 2020 along with the other maritime surveillance aircraft, Dornier 228, 25 with the Navy with 12 more on order and another 38 with the Indian Coast Guard while the IAF operates 40 of these in the utility role. The helicopter squadrons operate the Kamov Ka-31 in the AEW&C role, the Ka-28 and the Westland Sea King Mk 42 in the ASW role, six Sea Kings also procured for the commando/troop carrying role, and the HAL built Chetak (Alouette-III) and ALH Dhruv in the utility role. The UAV squadron operate the IAI Heron and Searcher Mk II.⁵⁰

The procurement process for another 57 carrier based fighters has also commenced with issue of a Request For Information (RFI) in late 2016 with the formal Request For Proposal (RFP) expected to be issued in 2019. In addition, the Navy is also progressing the acquisition of 111 Navy Utility Helicopters (NUH) while 24 Multi-Role Helicopters (MRH) are being procured from the US with delivery expected in mid-2020.⁵¹ A requirement for a total of 24 P-8I MR aircraft is also envisaged for meeting the requirements of maritime surveillance

and MDA in the area of interest. However, the Navy does not have any assets of its own for AAR or fixed-wing AEW/AWACS and necessarily depends on the Air Force to provide this support when required.

Inferences

Despite the doctrinal emphasis on power projection in the region by both the Air Force and Navy, looking at the relative overall strength of air forces in the region, the rapid modernization of Chinese air power assets and even the Pakistan Air Force with Chinese help, it is considered unlikely that Indian air power would be able to effectively meet the challenges or even deter its likely adversaries from any misadventure in the Indo-Pacific in the long-term on its own. Ever since the 1970s–80s, the IAF enjoyed at least a modicum of technological superiority over its potential adversaries, which could, at least, deter them thus maintaining an overall semblance of peace and stability in the region, minor skirmishes and stand-offs notwithstanding. This edge is now being lost with the modernization of the PLAAF and PLAN. India just has not been able to keep pace with the large numbers of fourth and fifth generation fighters along with supporting elements being inducted by China. As a matter of fact, unless urgent efforts are made to increase the budgetary support, improve the procurement process and the higher defense management along with the indigenous defense-industrial base, it is probable that India would fall further behind in its deterrence capability even in the Indian Ocean Region, much less the Indo-Pacific, in the next decade itself. This may embolden its adversaries in the region and invite aggressive moves.

Perhaps it is with this in mind that Prime Minister Modi has been making all-out diplomatic efforts to avoid a conflict with China while strengthening bilateral/multilateral ties and cooperation in the region with his “Act East” and Security and Growth for all in the Region (SAGAR) policy. As a rising economic and military power without any hegemonic ambitions, India has also been seen as a net security provider in the region, consequent to the growing apprehensions on the aggressive rise of China. However, to live up to this role, much more needs to be done, as also voiced by other countries in the region,⁵² so far limited due to India’s non-aligned heritage, to make such cooperative and collaborative arrangements effective in encouraging its ultimate objective of a rule-based code of conduct, respect for international law, and unhindered freedom of navigation in the region.⁵³

At the same time, it remains to be seen whether such cooperative agreements would actually work should deterrence fail and an engagement with force does take place, particularly with China’s policy of engaging only bilaterally with other nations on disputes. Minor irritants in the Indo-US relations also frequently mar the emerging strategic partnership with the US. In the long run, it is felt that India has no option but to develop its own capabilities for effective deterrence in its area of interest.

In the interim, while India builds up the requisite deterrence capability in the region, it may perhaps do well to use its strategically advantageous position in

the Indian Ocean by accelerating infrastructure development in the southern peninsula and island territories while implementing a joint strategy between the Air Force and the Navy for operations in the region. Also, while the IAF has demonstrated its ability to switch forces rapidly in Exercise Gagan Shakti of April 2018 wherein it generated some 11,000 sorties in three days,⁵⁴ it may do well to acquire more combat support assets within the available funds, than just big-ticket combat aircraft, as force-multipliers. This may also facilitate a more cost-effective utilization of the limited budgetary allocations toward acquiring the desired capability, not merely expensive assets. It could also pre-position support equipment and stores at various locations till it can acquire the requisite numbers of combat systems for all fronts. The integrated approach with the Navy for capability is also likely to better convince the political leadership of the budgetary requirements than the current competing individual service demands for assets. A mutually accepted joint concept may also require regular operations, if not permanent positioning, of some Air Force combat and support elements in the area along with existing naval forces, to make up for the existing deficiencies in the naval air arm. Such forward presence would not only aid in improving the readiness levels but also increase the deterrence value of Indian Air Power in the region. Credible maritime deterrence may also yield dividends in terms of stability on the land borders.

Notes

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- 3 Punj, *Pioneer*, December 22, 2014.
- 4 For a detailed analysis of India's policies and its relations with China, see Sibal, 2012 and Singh, 2012.
- 5 Singh, 2012, p. 2.
- 6 Chellaney, 2018.
- 7 Pannikar, 1946, p. 19.
- 8 Craig, *Quartz India*, January 14, 2019.
- 9 Mukherjee, 2016, p. 90. Also see for a study on the Andaman Nicobar Command.
- 10 <https://chinapower.csis.org/military-spending/>.
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- 13 Rajkumar and Singh, 2013.
- 14 Subramaniam, 2016, pp. 224–229, Singh, 2007, Vol. II, pp. 89–107, and Verma, 2016, pp. 381–385.
- 15 Singh, 2007, Vol. II, p. 98.
- 16 Subramaniam, 2016, p. 332. Also see Mohan and Chopra, 2005.
- 17 Singh, 2007, Vol. II, pp. 152–196. Also see Subramaniam, 2016, pp. 337–438 and Mohan and Chopra, 2013.
- 18 *Doctrine of the Indian Air Force*, 1995, IAP 2000, p. 66.
- 19 Singh, 2007, Vol. III, pp. 108–125.
- 20 *Ibid.*, Cover.
- 21 *Ibid.*, p. 183.
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- 44 *Economic Times* on INS Viraat Decommissioning, July 14, 2018.
- 45 INS Vikramaditya at indiannavy.nic.in/ins-vikramaditya.
- 46 *Vayu Aerospace & Defence Review Magazine*, VI/2018, pp. 12 & 27–31.
- 47 *Indian Maritime Doctrine*, p. 77 & 125.
- 48 *Ensuring Secure Seas: Indian Maritime Security Strategy*, p. 71.
- 49 For a detailed discussion on the naval force structure issues, see Rehman, 2016, pp. 37–64.
- 50 *The Military Balance* 2019, pp. 269–271 and indiannavy.nic.in.
- 51 *Vayu Aerospace & Defence Review Magazine* VI/2018, pp. 27–31.
- 52 Supriyanto, 2016, p. 210.
- 53 For more on India’s diplomatic and cooperative efforts, see Mohan, 2016, pp. 106–124.
- 54 Bhushan on Exercise Gagan Shakti, 2018.

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12 Pakistan

Kaiser Tufail

The geopolitical landscape

Soon after independence on 14 August 1947, Pakistan found itself tangled in a dispute with neighboring India over the status of the princely state of Jammu and Kashmir.¹ Being a contiguous, Muslim-majority state ruled by a Hindu Maharaja, Pakistan expected that the wishes of the people would be taken into account while deciding whether to opt for India or Pakistan. Unfortunately for Pakistan, the colluding Maharaja chose to accede to the Indian Union on 26 October 1947, prompting Pakistan to cobble up tribal militias to wrest Kashmir by force.

By the end of the year, Pakistani-supported militias had managed to capture a swathe of territory in the Himalayan foothills, now known as Azad Kashmir (Free Kashmir).² Simultaneously, the ethnically distinct Shina speakers of Gilgit Agency also rose in revolt against the Maharaja. The uprising had an unlikely supporter in Major William Brown, Commandant of the Maharaja's Gilgit Scouts who, along with his officers and men, mutinied and overthrew the local Governor in a bloodless *coup d'état*.³ The Pakistan flag was hoisted at the Gilgit Scouts Headquarters, and the Pakistani government was asked to take over the administration of Gilgit, which it gladly did. Fighting continued in the adjoining Baltistan District, till its headquarters at Skardu fell to the coalition of Gilgit Scouts and the irregular forces, in May 1948. With the capture of Gilgit and Baltistan, almost one-third of Kashmir came under Pakistani control.⁴

Today, Pakistani-held Azad Kashmir and Gilgit-Baltistan, and Indian-held Jammu and Kashmir, remain bones of contention in one of the longest running disputes in the world. India argues that successive elected governments in the State of Jammu and Kashmir reflect the Kashmiris' desire for staying in the Indian Union. Pakistan, on the other hand, points to the unending insurgency in Kashmir as testimony of extreme discontent amongst the majority Muslims, whose right of self-determination remains unexercised. Pakistan's stand regarding the Kashmiris' right of free will is also reinforced by the as yet unactioned UN resolution, that calls for a plebiscite as a final solution to the dispute.

Unmistakably, Kashmir has been central to the two Kashmir Wars of Liberation fought between India and Pakistan in 1947–1948 and 1965. While the dispute

has an overriding humanitarian aspect, it is also conjoined to the issue of territoriality. The contours of military strategy of both India and Pakistan, thus, continue to be shaped by a quest for altering the jurisdiction of the disputed territory, by force if necessary.

It can thus be seen that actualization of a cogent military response on multiple fronts on an ever-changing geopolitical landscape has been, and remains, a formidable challenge for the Pakistani armed forces.

Pakistan's military doctrine

Having achieved nuclear parity within days after India's nuclear tests in May 1998, Pakistan today finds itself secure and smug by having drastically restricted the options of any aggressor. A war between the large fielded armies of India and Pakistan vying to capture targets of strategic importance within the heart-land is a thing of the past. Pakistan, however, does not rule out the possibility of being subjected to aggression on insubstantial pretexts, to assuage electoral compulsions or to appease the media-hyped public.

Articulation of response to any offensive enemy action lays a premium on Intelligence, Surveillance, and Reconnaissance (ISR) capability, to detect rapid assembly of enemy forces that are already prepositioned in a forward posture during peacetime. These roles are performed by the air force and army, as per their specific requirements. Next in importance is the necessity of achieving local air superiority, a task most crucial for unhindered provision of Offensive Air Support (OAS) within the battlefield.⁵ This direct air support is the key to timely and precise force application from the air, and has utmost significance in a fast-paced, highly mobile land battle. Any deeper interdiction beyond the battlefield is likely to produce results in a relatively longer timeframe compared to OAS, and would be undertaken only with careful consideration of the tempo of the land battle. Strategic bombing with conventional weapons for destroying the enemy's war-making potential has limited value in a short war, as the results of the bombing campaign impact the battlefield over a long term. Such a campaign is also far removed from the immediate objective of countering the enemy's land offensive. The Pakistan Air Force (PAF) then, can be seen as a crucial enabler of a swift response by the Pakistan Army, so that land battle objectives are achieved promptly, while operating under a nuclear overhang. Needless to emphasize, a prolonged conflict is laden with the disagreeable possibility of nuclear thresholds of belligerents getting lowered to dangerous levels. With nuclearization in the region, PAF also has a key role in the country's full-spectrum nuclear deterrence, and maintains an air-launched strategic strike capability as part of a comprehensive nuclear triad.

It is evident that continental strategy reigns supreme in Pakistan, as long as disputes on land continue to remain unresolved. As for maritime strategy, it essentially revolves around the Pakistan Navy's (PN) ability to safeguard own vital sea lines of communication (SLOCs) through sea denial. Conventional diesel-electric submarines and a small but potent land-based naval air arm specializing

in anti-submarine warfare (ASW) and anti-surface vessel (ASV) warfare – the latter role shared with PAF – is the mainstay of this sea-denial strategy. As major economic enterprises develop on the Makran Coast, upgradation of PAF's capabilities to provide extensive air defense cover in the north Arabian Sea is also under active consideration.

Employment of air power in the counter-insurgency (COIN) role has been a sporadic undertaking by PAF, as a continuation of the “watch and ward” duties performed by its predecessors, the Royal Air Force (RAF) and Royal Indian Air Force (RIAF). Occasional flare-ups by dissidents in the now defunct tribal areas abutting the Afghan frontier have been effectively dealt with by intervention from the air.

A completely new challenge for Pakistani military strategists emerged as a consequence of punitive US intervention in Afghanistan, following the Al-Qaeda terrorist attack on the Twin Towers in New York, in 2001. The continued presence of US forces in Afghanistan has, however, resulted in retaliation by the recalcitrant Taliban, who once held power and supported Al-Qaeda. Pakistan finds itself caught in the crossfire of this insurgency, as the Taliban see Pakistan facilitating US involvement in Afghanistan. Cross-border terrorism by the Taliban has cost Pakistan over 70,000 lives, and the country has had to recast its military strategy and wherewithal, to deal with the changed nature of conflict.

With the onset of Taliban uprising in the border regions adjoining Afghanistan, PAF has been fully occupied in pacifying the insurgents. Intelligence-based pinpoint targeting of terrorist safe houses, armament caches, and insurgents' training centers has yielded positive results. PAF and Pakistan Army have been acting in unison, and the Taliban terrorist threat has been largely rooted out in the country.

Early years of Pakistan Air Force

At independence, the fledgling Royal Pakistan Air Force (RPAF) received only a part of its agreed upon share from RIAF in the shape of a squadron of Hawker Tempest fighters, some Douglas DC-3 Dakota transports, and a handful of De Havilland Tiger Moth and North American T-6G Harvard trainers. Over the next decade or so, it struggled with resource constraints but managed to cobble up four squadrons of Hawker Fury fighters, a few Handley Page Halifax bombers, an atrociously large number of 81 Bristol Freighter transports, and a squadron of the disreputable Supermarine Attacker jet fighters. Dumping of some questionable British products on the RPAF was manifest, but the choices were limited under the prevailing circumstances. It must be conceded, however, that the RAF C-in-Cs, who were seconded to command the RPAF in its early years, put the service on a sound footing with the resources they had at their disposal. RPAF had truly begun to learn to do the most with the least, as it were.

The fortunes of RPAF turned for the better when it signed the Mutual Defense Assistance Agreement with the US in 1954. (The ‘Royal’ prefix was dropped in 1956 when the country became a republic.) Between 1955 and 1963, PAF saw the induction of 120 North American F-86F Sabre, 12 Lockheed

F-104A Starfighter, 25 Martin B-57 light bombers, along with Cessna T-37 and Lockheed T-33 trainers, and Lockheed C-130B transports.

Training on US-origin aircraft entailed new methodology and tactics that laid great stress on operational efficiency and air discipline. Flight safety improved dramatically as the concept of zero tolerance for any infringements was introduced. Within a decade of switch to US systems, PAF had become an effective war-fighting machine. Masterly skills in air combat, exceptional bombing and gunnery scores, and world class air displays testified to the confidence and professional competence of the pilots.

Kashmir Liberation War of 1965

PAF's combat readiness was soon put to the test in the Kashmir Liberation War of 1965. Pakistan's material help to the infiltrating irregular troops inside Indian-held Kashmir was met with an Indian response, that saw the capture of the vital Haji Pir Pass. To forestall an advance towards the threatened city of Muzaffarabad, the capital of Azad Kashmir, Pakistan Army launched a diversionary offensive effort towards the town of Akhnur. The two-fold aim of this move was to relieve pressure at Haji Pir Pass and also to capture the important Akhnur Bridge, thus choking off all communications with Srinagar, the capital of Indian-held Kashmir. Seeing the possible severance of the road link to Srinagar as a strategic disaster, India decided to open up a front across the international border. She launched a widespread three-pronged offensive against Lahore-Kasur Sector at the dawn of 6 September. In the serious situation that had developed, PAF was put into action where, inexplicably, it had a free hand. By midday, incessant rocket and strafing attacks on the Indian armor spearheads by PAF Sabres had staunched the offensive. Pakistan Army units quickly regained balance, and managed to keep the Indian formations at bay for the remainder of the war.

Air operations during the 17-day war saw PAF achieve complete domination, destroying a total of 66 IAF aircraft, against the loss of 16 of its own.⁶ Highly successful airfield attacks by Sabres, and precise night attacks by B-57 bombers, were vital factors in this rout. PAF's headliner of the air war was the quintessential fighter pilot, Sqn Ldr M M Alam, who emerged – and remains to date – as the only ace of the subcontinent. At the end of the war, the overall attrition rate (based on sorties flown) was 1.67 percent for IAF, versus 0.7 percent for PAF. For an air force three times smaller than its adversary, inflicting an attrition rate more than twice over was a highly creditable achievement. The war on the ground ended in a stalemate of sorts, with neither side having achieved any substantial territorial or political objectives. The ably led PAF had, however, carved a name for itself as a plucky arm that could surely give pause to any potential adversary.

PAF re-equips in the face of US sanctions

The 1965 war resulted in immediate sanctions imposed by the USA on both India and Pakistan. Explaining the sanctions, the White House Special Advisor

on South Asia, Robert Komer stated that, "In the light of UN appeals, we [USA] cannot be in the position of adding fuel to the flame.... It may well help bring home to both [India and Pakistan], the consequences of their folly."⁷ Most affected by the sanctions was PAF, whose complete inventory was of US origin. With the spares supply suddenly stopped, the operational capability of PAF started to nosedive. The C-in-C of that time, Air Marshal Nur Khan, sensed the criticality of the situation, and started an immediate search for suitable combat aircraft from new and dependable sources.

For Pakistan, the prevalent geopolitical realities restricted most of the available options. Pakistan's CENTO membership hardly endeared her to the Soviets. The Indians had already made inroads to Moscow, and the first shipment of six MiG-21s had made their operational debut during the 1965 war.

The Soviets saw India not only as a socialist ideologue that could be helped militarily, but as its influential proxy and mouthpiece in the Non-Aligned Movement. The prospect of Soviets and Pakistanis developing any kind of patron-client linkage, thus, came to be a non-starter.

China, in the throes of the Cultural Revolution, had not shown much interest in developing newer aircraft technologies for the time being. Content with the copy of Soviet-supplied MiG-19s, China mass-produced this single-role fighter-interceptor (renamed F-6) in thousands. When Pakistan approached China for military help immediately after the 1965 war, she was only too glad to offer the F-6 to the new friend, the initial batch of 60 being free of cost. Several more batches were procured at a very affordable price.

Another quick-fix solution was found in the shape of 90 ex-Luftwaffe Canadair Sabre Mk-6 (called F-86E in PAF), which was a more powerful Canadian version of the North American Aviation F-86F. The deal was sealed in 1966 with the help of Iran, which had agreed to be the bogus buyer of West Germany's used fighters; this subterfuge was to bypass any objections which India was bound to stir up, had the deal been open and direct. It was expedient too, for the US administration to look the other way as Pakistan was still a CENTO and SEATO partner, having provided useful aerial spying services against the Soviet Union.

A total of 24 modern Dassault Mirage IIIE/R/D procured from France in 1968 were the newest and most advanced addition to PAF's combat aircraft inventory. Besides performing a wide variety of missions, the Mirages could generate a higher daily sortie rate compared to the much older F-86s, F-104s, and B-57s. They could navigate accurately to relatively deeper targets at low level, and after the attack, egress at high speed.

It goes to the credit of Air Marshal Nur Khan for having inducted more than 200 aircraft in PAF, within three years of the 1965 war. This 60 percent boost in aircraft numbers within a very short period put pressure on the pilots' training programme; however, PAF was up to the challenge, and the pilots had full command over their new steeds in no time. Alongside these latest acquisitions, PAF had the aging F-86F and F-104A/B fighters, and B-57B/C bombers which were already

second-hand aircraft belonging to USAF or air forces of partner nations, and had been transferred to Pakistan under the US Military Assistance Program.

Indo-Pak War of 1971

Within six years of the 1965 war, Pakistan found itself drawn into a war that was triggered when the Pakistani military junta failed to transfer power to the majority party following elections in 1970. Though the Awami League had participated in a manifesto that verged on extreme autonomy, denial of the peoples' mandate resulted in a civil disobedience movement in erstwhile East Pakistan, the province from where the party had obtained an overwhelming majority. The army's crackdown soon cascaded into a civil war, which India found too opportune to let go, as it offered the prospects of truncating Pakistan's far-flung eastern wing from the rest of the country.⁸

India's military intervention in East Pakistan on 21 November, surreptitious as it was, resulted in a belated riposte in West Pakistan on 3 December. PAF Mirage IIIEs and F-86s led the dusk strikes against IAF airfields, while B-57 bombers continued the onslaught through the night. Continued offensive counter air operations against airfields caused optimal softening up. For 10 percent of the total effort, the degree of disruption was quite adequate, and tied down IAF effort for air defense. The Indian Army responded with a major corps-size offensive in Shakargarh Sector, along with two brigade-size offensives in the Thar Desert Sector. Outnumbered and outgunned, the Pakistan Army asked for PAF's air support which was prompt and plentiful. Over the next two weeks, PAF remained busy with firefighting in the besieged sectors. All the while, PAF maintained control of the air in the embattled northern parts of West Pakistan, and was able to perform its air support tasks without undue interference by the IAF. It is to the credit of PAF that the Indian land offensives were prevented from reaching any strategic objectives in the West Pakistani heartland, though the territorial losses were considerable. The combined tally of PAF and Pak Army AAA was 60 IAF aircraft against the loss of 27 of its own.⁹ In East Pakistan, where PAF was outnumbered 12:1, the lone No 14 Squadron fought a classic battle against odds while it lasted, but could do little to prevent an eventual defeat of the ground forces.

At the end of the war, the overall attrition rate for both IAF and PAF stood at 0.91 percent. PAF had parried the enemy's blows and had been ever so careful in its offensive responses. It continued to be fixated with remaining viable for providing complete air support to the Army's all-important main offensive, which unfortunately, was not to be. PAF's overall performance can be gleaned from the fact that it had managed to keep its aircraft attrition rate at par with the much bigger and stronger IAF. It can be said that when the war ended in West Pakistan on 17 December, PAF was still "in the ring and on its feet."¹⁰ It had unmistakably denied a much stronger IAF the distinct possibility of delivering a knock-out punch to it. Under the difficult circumstances, this was not an insignificant achievement.

Incessant US sanctions

The 1971 war triggered another round of US military sanctions against Pakistan, this time on dubious charges of “human rights violations” in erstwhile East Pakistan. In the face of continual sanctions, Pakistan found it sagacious to look for non-US sources of military hardware. Starting in 1973, and spread over a decade, PAF added 72 additional Mirage III/5s to its inventory. Alongside these modern acquisitions from France, PAF also procured more F-6s, and later its strike variant, the A-5, from China. Happily, both suppliers turned out to be reliable, and PAF regained balance in the face of “on-off” sanctions. Two more spells of US sanctions followed: one for signing a deal with France for a nuclear reprocessing plant (1977), and another for manufacturing gas centrifuges for a uranium enrichment plant at Kahuta (1979).

With the Soviet invasion of Afghanistan in 1979, the US saw Pakistan as a useful conduit for material support to the Mujahideen, and once again started to cozy up by lifting the sanctions. US clearance to sell what was then the world’s best fighter, was a windfall for Pakistan by all standards, though a cause of considerable consternation in the South Asian neighborhood. Starting in 1983, PAF received its first batch of 40 F-16A/Bs. Pakistan duly returned the favor by facilitating US goals of evicting the Soviets from Afghanistan. PAF was also prompt in demonstrating its combat skills on the advanced F-16s, by shooting down as many as five Afghan/Soviet aircraft intruding into Pakistani airspace. Had the rules of engagement not been as strict as they were, the outcome would have been twice as profitable. Throughout the war, Pakistan provided air and land bridges to support deployed US forces in Afghanistan. When the Soviets had been driven out after a decade of occupation in Afghanistan, and the USA’s work was done to its satisfaction, the latter had no qualms about springing the sanctions surprise on Pakistan yet again. In 1990, the US President decided against certifying to the Senate about non-possession of a nuclear device by Pakistan.

For Pakistan, the ignominy of the loss of its eastern wing in the 1971 war had underscored the importance of an iron-clad defense, which only a nuclear deterrent offered. Pakistan had clandestinely progressed to weapons grade know-how, and there was no going back. Having dealt with five sanctions regimes in a quarter of a century, Pakistan could handle more. These came in quick succession, on charges of carrying out nuclear tests by a non-nuclear state (1998), and a military coup against an elected government (1999). Incredibly, there seems no let-up in the coercive sanctions regime, with the most recent stoppage of aid resulting from inability of the US Secretary of State to certify Pakistan’s cooperation in anti-terrorism efforts (2018). Clearly, US sanctions have been brandished as a leverage tool, to be employed as and when required in this rather granular partnership.

Over the years PAF has learnt to tackle the ebb and flow of US support with a two-pronged approach. It has diversified the sources of its hardware, and has progressively striven for self-sufficiency.

Pakistan Air Force today

Organizationally, the Air Headquarters is structured on a four-tier basis, with top-down appointments of Deputy Chiefs of Air Staff, Assistant Chiefs of Air Staff, Directors and Deputy Directors manning various directorates or “sub-branches,” as they are commonly called. These include Operations & Plans, Air Defense, Engineering, C4I, Personnel, Projects, Support, Training, Administration, Security, Intelligence, and the Inspectorate. Chief of the Air Staff (CAS) heads the Air Board which is composed of various DCASs who are his Principal Staff Officers, while the Vice Chief of Air Staff stands in as his deputy. Various Bases and field units report to one of three regional commands headed by Air Officers Commanding, who are directly subordinate to the CAS.

With regard to weapon systems, PAF is well on the way to modernization of its fleet to the so-called 4+ generation of fighters, though half of it still includes F-7P/PG (Chinese derivatives of the early model MiG-21F) and Mirage III/5 that first flew in the mid-fifties.

The Mirages have had a long service in PAF, which began in 1968. Out of a total of 200 Mirages that have flown in PAF, 96 were purchased new, while 104 were acquired and refurbished from ex-Australian, French, Lebanese, and Libyan stocks. As many as 80 non-airworthy Mirages obtained from Australia, Libya, and Spain were cannibalized for spares, and continue to sustain the fleet as it soldiers on beyond the fifth decade. An additional 30 ex-Egyptian Mirage 5 are being acquired, and it is expected that at least one squadron would be formed out of the airworthy lot. The ten different sub-types of Mirages have been modified to perform specialist roles including forward-looking infrared (FLIR)-aided night strikes and precision stand-off bombing.

The F-7Ps inducted in 1988 have served in the point defense intercept and close air support roles. As a nifty fighter that is fairly tolerant of mistakes, it has also performed usefully for operational conversion of novice fighter pilots. A total of 135 F-7Ps had been procured till the arrival of the much-modified F-7PG in 2001; 65 F-7PG were eventually procured. The new version, with a more powerful engine, double-delta wing planform, and maneuvering flaps vastly improved upon the performance of its progenitor. The year 2001 also marked the retirement of the aging F-6, of which 260 had seen service in PAF, spread over 35 years.

PAF’s ongoing fleet modernization program aims at a two-type fighter inventory, including 76 F-16A (MLU)/F-16C (Blk 52), and up to 250 Pak-China JF-17 Thunder. The program entails an ongoing replacement of the F-7P/PG and Mirage III/5 with the JF-17. The JF-17, in its Block III iteration (with AESA radar, HMD/S, additional sensor station, and integral electronic warfare suite) is expected to be the workhorse of PAF over the next two decades, at least. In the interim, design work on a fifth generation fighter continues under the Project *Azm* (Resolve) that was launched in early 2018.

Significant air-to-ground capabilities of both the F-16 and JF-17 rest on their state-of-the-art Sniper and Aselpod targeting pods. These pods allow aircrews to

detect, identify, and engage targets outside the range of most enemy air defenses. The pods incorporate a high definition FLIR seeker, as well as visible-light HDTV, laser spot tracker, laser marker, video data link, and a digital data recorder. The pod's FLIR allows observation and tracking through smoke and haze, and in low light or no light conditions. The video of the target can be shared with formation members, or directly with army formation commanders in real time through data link.

A modernized PAF featuring a full-fleet BVR intercept capability, with data-link support from ground and airborne early-warning radar platforms, targeting sensors for day/night precision attack, integrated electronic warfare suites, and an array of stand-off weapons against land and maritime targets, is expected to take shape within a decade. With the added ability of the JF-17 and Mirage III/5 to launch cruise missiles having conventional or unconventional warheads, PAF has unequivocally moved beyond the largely tactical role that it had in the past.

Transport aircraft for combat support operations include 16 C-130B/E and 4 CN-235. Rapid deployment of combat units to their forward locations during any contingency is the most vital aspect of these operations. Four Il-78 aerial tankers provide in-flight refuelling to Mirage IIIEA and JF-17 aircraft employing the probe-and-drogue method; the huge tankers can also perform a useful heavy-lift or over-sized cargo transportation role.

Three Dassault DA-20 Falcon electronic warfare aircraft provide radar and radio communications jamming, and other electronic support measures.

A small element of two AW-139 or Mi-171 helicopters provides aircrew combat search and rescue (CSAR) service at each flying base. The older SA-319 Alouettes have been assigned a training role, pending their eventual phasing out.

For pilot training, PAF uses the locally manufactured *Super Mushshak* primary piston trainer, Cessna T-37 basic jet trainer, and the Pak-China co-produced K-8 advanced jet trainer. The PAF Academy aerobatics team *Sherdils* (Lion Hearts) performs air displays on the K-8.

UAVs continue to supplement manned fighters for reconnaissance missions. Their ability to stay aloft for long durations, and transmission of reconnaissance imagery to field formations through data link, are seen as major capability upgrades. The success of the COIN campaign in terrorist hideouts near the Afghan frontier has been, in large part, due to the vastly improved situational awareness for troops on ground as well as aircrew in the air.

Defense of Pakistan's air space is the responsibility of PAF's Air Defense Command, with surveillance, identification, and fire control orders being within its sole ambit. Air space is surveilled by airborne, as well as ground-based early warning radar systems. Six SAAB 2000 Erieye and four Chinese ZDK-03 Airborne Early Warning & Control (AEWC) aircraft provide over-the-horizon surveillance in the mountainous areas of the north, as well as vast stretches of the Arabian Sea. An assortment of Lockheed-Martin TPS-77, Westinghouse TPS-43G, and Chinese Nanjing YLC-2 radars provide ground-based surveillance at medium to high altitudes, while YLC-6 and Siemens MPDR-45/60/90 radars cover low altitudes. The low-budget, "eyes and ears" Mobile Observer

Units are used to plug in the gaps in areas where terrain or logistics resupply constraints preclude deployment of radars. The inputs from this complete array of sensors are fed through several Generic Mission Control Centers, to the four fully automated Air Defense Sectors for further kinetic action, as required.

The three services have their own terminal defense weapons. PAF utilizes the vehicle-mounted Spada 2000 surface-to-air missiles (SAMs), along with a mix of Mistral and the locally developed *Anza* shoulder-fired missiles, for defense of air bases and radar sites. The air defense missiles at PAF bases are also supplemented by the Army's radar-controlled AAA. The Army covers its deployed field formations with the LY-80 SAMs, along with *Anza* and Stinger missiles. The Navy provides cover to its shore establishments with the Mistral and FN-6 missiles.

Other components of air power

Beginning as an Air Observation Post (AOP) flight of Artillery in 1947 with just four Auster Mk-V aircraft, the unit was established as a separate Aviation Corps of Pakistan Army much later, in 1976. During the 1965 and 1971 wars, this aviation component provided sterling combat support with the L-19 Bird Dog AOP aircraft, and OH-13 Sioux and Mi-8 helicopters. The Corps was raised to the status of a Command in 1988, with a General Officer Commanding heading the Army Aviation Command. It has grown into a sizable supporting arm of the Army, with 235 helicopters and as many as 150 fixed-wing aircraft.

The most lethal component of the helicopter inventory are 50 gunships which include AH-1F/Z Cobra and Mi-35, with an additional 30 Turkish T-129 on order. The gunships have seen effective action in COIN operations in Pakistani tribal areas abutting Afghanistan. Troop and freight transport helicopters include the AW-139, Bell 412, Mi-17/171, and SA-330 Puma. During peacetime, these helicopters have been immensely useful in disaster relief operations like floods and earthquakes, which are not infrequent in the country. Light utility helicopters include the AS-350 Écureuil, Bell 206 Jet Ranger, SA-319 Alouette III, and SA-315 Lama. Some of these light helicopters are also operated by para-military forces like Coast Guards, Rangers, and Frontier Corps, but maintained by Army Aviation. Helicopter training is done on Schweizer 300 and Enstrom 280.

The fixed-wing inventory of the Army Aviation includes several types of piston, turboprop, and executive jets of the "general aviation" category. They are used mostly for the purpose of transportation of senior formation commanders for meetings with the General Staff at GHQ. One of the noteworthy fixed-wing aircraft is the locally manufactured MFI-17 *Mushshak* primary trainer, of which over 100 continue to operate since their induction in the Army in 1976. Besides primary training of pilots, it serves useful operational tasks of forward air control, artillery spotting, and light communications.

The Army Aviation has to its credit several successful UN peacekeeping deployments in Burundi, Sierra Leone, Somalia, and Sudan. It has also carried out some daring high altitude combat support and rescue missions in the mountainous areas of northern Pakistan.

The PN's land-based Naval Air Arm was established in 1975 as a result of lessons learnt after the 1971 war, when the PN surface fleet took serious losses in the absence of dedicated maritime patrol and rapid response platforms, to deal with evolving threats at sea. The air arm focuses on maritime patrol, anti-surface vessel warfare, and anti-submarine warfare with the help of fixed-wing aircraft, as well as helicopters. All three roles are comprehensively performed by the Harpoon-armed P-3C Orion, whose reach extends over vast stretches of the Indian Ocean and the Arabian Sea. The specially configured ATR-72 can perform maritime patrol as well as ASW, while the legacy Fokker F-27 performs maritime patrol tasks, albeit over shorter ranges. ASV warfare in high-threat environments – like an enemy surface task group defended by fighter aircraft – is conducted by a squadron of PAF's latest JF-17s, equipped with the C-802 anti-shiping missile. It was recognized that not only did the special skills required to operate and maintain a multi-role fighter lay with the air force, but the optimal utilization of such a platform could not be justified were it to be utilized in a single role by the navy. The existing arrangement has worked out to the satisfaction of both services for over 35 years, when PAF's AM-39 Exocet-equipped Mirage 5PA3 first assumed the maritime attack role. Excellent cooperation exists between the two services, and PAF regularly participates in PN exercises.

An important role of defensive screening of own naval task force against surface and sub-surface threats, is performed by a squadron each of Harbin Z-9 (in the ASW role) and Westland Sea King helicopters (in ASV and ASW roles). Search and rescue, and command liaison tasks are performed by SA-319 Alouette helicopters. The PN frigates are equipped to embark one helicopter each for any of the selected tasks. The PN helicopters have also played a noteworthy role in periodic flood relief operations in the coastal areas of Pakistan.

Three BN Defender aircraft are utilized by the PN-controlled Maritime Security Agency for enforcement of maritime law in international waters, as well as policing of Pakistan's exclusive economic zone.

Civil Aviation assets, including all civil aircraft registered in Pakistan, are liable to be mustered during any emergency, as per the country's legal stipulations. In the past wars, aircraft of the national airline were used for flying-in military equipment and spares from other countries. Aircraft were also put at the disposal of the navy for maritime reconnaissance at a time when the Naval Air Arm did not exist. In any future war, the Ministry of Defense can count on about two dozen airliners and twice as many general aviation aircraft to be available for transportation of men and material, for search and rescue, and for reconnaissance purposes.

PAF's transnational exposure

PAF has had the unique opportunity of training pilots of many air forces in the Middle East and Africa. PAF pilots have flown on trainers and fighters in Algeria, Egypt, Iraq, Jordan, Kuwait, Libya, Qatar, Saudi Arabia, Sri Lanka, Syria, Turkey, UAE, UK, and Zimbabwe. The pilots gained extensive experience on an

assortment of fighters including F-5A, F-5E, Lightning, MiG-17, Mirage F-1E, Gnat, Hunter, MiG-21FL/M, and Su-7; the latter four types were of particular significance to PAF, as these were flown by its traditional adversary, the IAF. First-hand knowledge about adversary aircraft, as well as well-honed flying skills of PAF's pilots were key factors in their remarkable performance during various conflicts.

During the 1967 Arab–Israeli War, PAF's expert marksman Flt Lt Saiful-Azam, who was on deputation to Jordan, downed an Israeli Mystère IVA while flying a Hunter. A day later, he shifted to an Iraqi air base and shot down an Israeli Vautour IIA and a Mirage IIICJ. A near-ace, he had earlier shot down an Indian Gnat in the 1965 war.

In 1974, during a combat air patrol in Syria, Flt Lt Abdus Sattar Alvi, part of an all-PAF eight-ship MiG-21 formation, downed an Israeli Mirage IIICJ, bringing some cheer to the beleaguered Syrian Arab Air Force.

PAF has also been a regular participant in various multinational exercises with China, Saudi Arabia, Turkey, UAE, UK, and USA. Pilots have enthusiastically fought against Hunter, F-4, F-14, and F-111 of yesteryears, as well as the modern fighters including F-15, F-16, F-18, J-10, J-11 (Su-27 copy), Mirage 2000, Tornado, and Typhoon. Operations in electronically jammed environments, flying in large strike packages at very low altitudes, and air combat against fighters with AEWC support, are some of the scenarios PAF pilots have been exposed to, during these exercises.

A quest for self-sufficiency

The Pakistan Aeronautical Complex (PAC) started off as an overhaul factory for the Chinese F-6 fighter, with the first aircraft rolling out in 1979. Several more factories were added over the years, resulting in today's vast complex at Kamra in northern Pakistan. PAC is a state-owned enterprise with the goal of self-reliance and indigenization in the field of military aviation. PAC is governed by a Board headed by the Chairman who is a serving Air Marshal of PAF. The PAC Board is overseen by the Ministry of Defence Production. PAC deals with two main aeronautical engineering activities: i) production of military aircraft, and ii) maintenance, repair, and overhaul (MRO) of military aircraft, engines, and ground-based radars.

Aircraft production takes place at the Aircraft Manufacturing Factory (AMF), the military aircraft production unit of Pakistan Aeronautical Complex. The factory was conceived for the licensed manufacture of the SAAB-Scania MFI-17 primary trainer aircraft, after sufficient experience was gained in assembling 92 of these from knocked-down kits. The new factory was inaugurated at Kamra in 1981, and in September 1983, it produced the first MFI-17, locally named *Mushshak* (Proficient). By end 1997, AMF had manufactured 180 *Mushshak* aircraft from raw materials for PAF, Pakistan Army, and overseas customers. In July 1996, the upgraded *Super Mushshak* featuring a more powerful engine, an air conditioned cockpit, electrical trimmers, and a digital glass cockpit, flew for the first time. In due course, all PAF *Mushshaks* were upgraded at AMF. By June

2018, 60 all-new *Super Mushshaks* had also been manufactured for overseas customers. Production continues apace for an increasing number of overseas orders.

Pakistan and China signed an agreement for design and development of an advanced jet trainer in 1986, on a 25 : 75 cost-sharing basis. The prototype K-8 flew in 1990, and PAF acquired the first batch of six aircraft in 1994. Satisfied with its performance, PAF signed successive contracts for 34 more aircraft. A total of 16 percent of the airframe including the horizontal stabiliser, vertical tail, and engine cowling was produced at AMF, with final assembly taking place at Hongdu Aviation Industry, Nanchang. The K-8 trainer has been exported to several countries, with PAC manufacturing a total of 50 sets of the afore-mentioned sub-assemblies.

In 1995, Pakistan and China signed an MOU for joint design and development of a new fighter. In 1999, a contract for co-production of the JF-17 was signed between China National Aero-Technology Import & Export Corporation (CATIC) and PAC. Soon AMF began manufacturing various components, and by 2008 production of sub-assemblies had started, which made up 58 percent of the airframe (wings, horizontal stabilizer, and vertical tail). The remaining 42 percent of the airframe (fuselage) is manufactured at Chengdu Aircraft Corporation, with final assembly of the aircraft taking place at AMF. As of December 2018, 112 aircraft had been manufactured at AMF. Work continues apace for an additional PAF order of 76 aircraft under the current fiscal outlay. With the capacity of AMF to produce up to 24 JF-17s a year, ongoing export orders are also being accommodated alongside PAF's requirements.

In 2007, Pakistan became the launch customer of Falco unmanned aerial vehicles (UAV) made by Selex, Italy, when it purchased eight knocked-down kits for assembly. Later, PAC signed a contract with Selex for manufacture of the UAVs. So far, 20 units have been manufactured by AMF.

MRO tasks are undertaken at three factories. The Mirage Rebuild Factory (MRF) overhauls Mirage III/5 fighter aircraft and its Atar 9C engine. Several engines of Western origin including Pratt & Whitney F-100–220 of F-16A/B, Allison T-56 of C-130E, Honeywell TFE-731 of K-8, and Continental J-69 of T-37 are also overhauled at MRF. The Aircraft Rebuild Factory (ARF) overhauls F-7P/PG fighter aircraft, K-8 jet trainer, and Y-12 commuter aircraft, along with overhaul of C-130 propellers; ARF also has several facilities that manufacture aircraft canopies, drop tanks, and electrical harnesses. The Avionics Production Factory (APF) overhauls ground-based radars, in addition to licensed production of the Italian Grifo 7 radar of F-7P/PG, and assembly of KLJ-7 radar of JF-17. APF also undertakes production of an assortment of avionics items including radar warning receivers, IFF, crash recorders, navigation systems, MFDs, and PCBs.

Future challenges

After nuclearization of South Asia, strategic parity of sorts has emerged in the region, and numerical disparity faced by Pakistani armed forces, especially PAF

and PN, has been largely negated by this new capability. As an agreeable consequence, the threat of an all-out conventional war has diminished considerably, and there is a need to slow down in the arms race that Pakistan has had to keep up with in the past. It has to be appreciated that India's rivalry with China compels her to be in constant military competition, something that Pakistan neither needs – at least not on that scale – nor can its economy sustain over a long term. PAF would do well to remain undaunted by the larger IAF, and continue to maintain a fine balance between quality and quantity of its weapons systems. The geopolitical changes in the region also call for a parsimonious evaluation of PAF's development goals that are in synch with new strategic realities. The China-Pakistan Economic Corridor, for instance, entails new security concerns for which PAF will have to be at the forefront in chalking out cogent responses. Similarly, the impending exit of US forces from Afghanistan, gradual as it might be, is likely to add to the responsibilities of Pakistan Army and PAF in maintaining stability in the region.

The previous two decades have seen the emergence of non-state actors as the new threat to much of the world, with its epicenter not too far from Pakistan. The country has faced the wrath of these terrorist groups, and PAF, alongside the Pakistan Army, has been at the forefront of COIN operations for many years. While the threat has been tackled to a large extent and most terrorist groups have been neutralized, splinter groups have raised their ugly heads whenever there has been a let-up in operations.

For PAF, fighting a perennial insurgency, while maintaining a credible deterrent posture against its eastern neighbor, remains the biggest challenge. In essence, Pakistan is confronted with a two-front threat, one from within, and the other from outside. Under these circumstances, committal of PAF's valuable fighter assets in COIN operations over a long term needs to be reviewed. Utilization of armed UAV and light attack aircraft (LAA) is considered a more viable and economical solution, as has been unmistakably demonstrated in Afghanistan by the USAF and the rejuvenated Afghanistan Air Force.¹¹ While PAF's high-end F-16s and JF-17s are very effective, they are expensive to maintain and sustain in a seemingly endless insurgency. Their use in low-intensity operations also detracts from PAF's ability to maintain full-spectrum operational readiness. As existing fighter fleets continue to age and new platforms place additional burdens on the maintenance and supply systems, it is imperative that PAF find ways of lowering its operating costs while maintaining its readiness standards.

A tri-services review of roles and responsibilities is long overdue, so that Pakistan's military machine continues to operate with complete operational efficiency and economy of effort. Areas long considered to be PAF's turf need to be clearly demarcated again, to ensure that there is no duplication of effort; this would also be a safeguard against any misunderstanding about who is the overall in-charge of some shared operational activities in war. Air defense is a domain that is seen to be most prone to impingement by other services. Command and control of airspace, and ownership of all early warning sensors by PAF has occasionally been the cause of some dissonance amongst the services; similarly,

the jurisdiction of each service for air defense of vulnerable points/areas, and choice of different categories of terminal weapons needs clearer delineation. Training establishments of the three services that impart the same courses – of which there are many – need to be unified. The Joint Chiefs of Staff Committee is considered the most appropriate forum for resolution of such issues, if only PAF and PN had cyclic representation on the top chair. For PAF, this goal will remain one of the significant challenges if it is to retain its operational influence, and its first-rate organizational functionality which is seen as a model of efficiency in the country.

Conclusion

Having risen from almost token beginnings, Pakistan Air Force transformed itself into a combat hardened air force in a very short period. It has managed to keep the aircraft fleet fully operational at all times, despite repeated sanctions by its principal hardware supplier. PAF's small size belies its strength, which is buoyed by well-trained manpower endowed with a strong fighting spirit. It should not be difficult to see why it has consistently achieved outsized effects through narrowly focused efforts.

As a pivotal enabler of ground operations, PAF has the ability to inflict casualties on enemy forces at stand-off ranges with precision weapons, thus preventing own troops from being exposed to the enemy's greater capacity of direct ground fire. The accuracy and increased level of intensity of air intervention now possible, allows a higher operational tempo that is highly desirable in a short conventional war. While support to surface forces remains an integral part of PAF's doctrine, the service remains cognizant of the need for achieving optimal control of the air over the area of ground or maritime operations. An overall favorable air situation, along with local air superiority in the area of critical battles, is well within the capabilities of today's PAF.

One of the noteworthy challenges PAF faces includes funding issues in an economy that could have been better managed over the years. The saving grace, however, is that PAF's pursuit of self-sufficiency has resulted in the highly successful JF-17 program, and is a superb example of affordable home-grown projects. PAF is also paying much-needed attention to armed UAVs alongside indigenous development of fifth generation aircraft, as spiraling costs of imported aircraft continue to dog most air forces of developing countries. Pakistan Air Force remains cognizant of the changing dynamics of aerial warfare, and is well up to the challenge of sophisticated and technology-intensive demands it is likely to face in the coming years.

Notes

- 1 At the time of independence, India had 565 Princely States which were ruled by a motley of potentates and had internal autonomy, while by treaty, the British Crown had suzerainty and was responsible for the states' external affairs and defense.
- 2 The area of Azad Kashmir is 13,297 km².

- 3 Major William Alexander Brown was appointed as a Member of the Most Excellent Order of the British Empire (MBE) in 1948. Much later in 1994, he was posthumously awarded the *Sitara-i-Pakistan* (Star of Pakistan) for services rendered during the Gilgit Rebellion.
- 4 The area of Gilgit and Baltistan is 72,971 km².
- 5 Offensive Air Support includes Close Air Support and Battlefield Air Interdiction, and is a direct form of air support.
- 6 Details of 66 aircraft lost by IAF in 1965 war: 17 lost in air combat, nine to enemy AAA, 39 lost on ground during air raids, and one to a combat-related accident. Details of 16 aircraft lost by PAF: eight lost in air combat, three to enemy AAA, two to own AAA, one lost on ground during an air raid, and two to combat-related accidents.
- 7 Cohen and Tucker, 1995, p. 161.
- 8 The straight-line distance between Dacca and Islamabad is 1,240 miles.
- 9 Details of 60 aircraft lost by IAF in 1971 war: 18 lost in air combat, 36 to enemy AAA, three lost on ground during air raids, and three to combat-related accidents. Details of 27 aircraft lost by PAF: ten lost in air combat, seven to enemy AAA, one to own AAA, seven lost on ground during air raids, and two to combat-related accidents.
- 10 The author of the Indian *Official History of 1971 Indo-Pak War* brought himself to extend this compliment of sorts to PAF in the concluding analysis, Chapter-X, "The IAF in the West," (Prasad, 1992, p. 449).
- 11 Afghanistan Air Force has been re-equipped with 26 Embraer A-29 Super Tucano light attack aircraft.

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13 Iran¹

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US Vice President Mike Pence spoke for many observers when, in early 2019, he stated that “the greatest threat to peace and security in the Middle East is the Islamic Republic of Iran.”² Whether one agrees or disagrees with the Vice President, Tehran has found itself involved in recent military conflicts in Syria, Iraq, and Yemen. Iran’s geostrategic competition with Saudi Arabia is fierce, its tensions with Israel famous, its interference in Lebanon longstanding, and the risk that it will find itself at war with the United States always low, yet never negligible. Understanding Iran’s military capabilities, doctrines, and broad strategic goals are as important as ever.

This chapter analyzes the air component of Iran’s military power and strategy. It begins by providing a brief overview of Iran’s strategic objectives. The remainder of the chapter is divided into two parts. The first part focuses on Iran’s contemporary airpower doctrine, capabilities, deployment patterns, and missions. We find that conventional deficiencies have led Tehran to focus increasingly on asymmetric and unconventional capabilities, and assess that this trend is likely to continue. The second section asks whether Iran is seeking nuclear weapons, and, if it acquired them, what type of nuclear posture it would adopt. We find that Iranian leaders, at the highest levels, made acquisition of a handful of low-yield nuclear weapons an explicit objective in the late 1990s or 2000. Although it is clear that Iran sought nuclear weapons from at least the late 1990s through 2003, it remains possible that for much of the previous few decades the goal had more to do with “hedging” than outright acquisition.

Strategic context

In 1979, militant revolutionaries led by the influential mullah, Ayatollah Khomeini, overthrew the US-backed Shah of Iran. Khomeini and the revolutionaries seized power at a time when the Shah’s popular support was waning as a result of a major recession, perceived subordination of Iran’s interests to those of the US and western culture, increasing ties with Israel, and the Shah’s over-reliance on his royal heritage over Iran’s Islamic history.³ Following the revolution, Khomeini ruled the country as Supreme Leader until his death in 1989. Since his death, Ayatollah Ali Khamenei has ruled the country for 29 continuous

years. Due to this unusual continuity, over time the Islamic Republic benefited from relative consistency in both domestic and foreign affairs with the Supreme Leader holding ultimate authority.

Iran's history as an empire, in contrast to more recent humiliation, also provides an important backdrop to understanding its foreign policy since the revolution. Impressive archaeological monuments harken back over 2,500 years to the greatness of Persian empires. Many Iranians link those same ancient ruins to important prophets, giving Persia claim to a grand position in Muslim religious tradition. It is in this context of deep traditions and past glory that Persians see themselves as fundamentally superior to their Arab neighbors in Saudi Arabia, Iraq, and other Gulf Cooperation Council (GCC) nations. But, despite this perceived superiority, the last several hundred years have seen Iran dominated by outside powers including Russia, Britain, and most recently the United States. Further influencing Iran's foreign policy is the perceived encirclement of the Islamic Republic by outside western powers, aided by neighboring Sunni Arab nations, intent on limiting Iran's influence in the region.⁴

For the better part of 30 years, Iran's strategic goals and motivations have remained relatively consistent. First, its rulers have sought to preserve the regime's control of the country. Second, defense of the Islamic Republic's territory has been a priority. The regime is determined to not repeat past humiliation at the hands of outside superpowers. Third, the regime wants to reclaim regional hegemony. Finally, spreading the Islamic revolution remains a high order goal for the regime as well as the extremely loyal Islamic Revolutionary Guard Corps (IRGC), an elite arm of the Iranian Armed Forces.⁵

In addition to these goals, several additional factors relevant to Iran's strategic direction merit mentioning. The regime has a hatred of both the United States and Israel. Iran seeks to undermine the existing state of affairs in the greater Middle East while supporting terrorism and unconventional warfare in pursuit of its aforementioned goals. Finally, Tehran's post-Iran-Iraq War narrative emphasizes Iranians' feelings of isolation and resentment toward the international community and the United Nations for failing to punish Iraq as the aggressor in the conflict. Distrust in international institutions and self-reliance in the face of national security threats provide underlying principles of Iranian foreign and defense policies.⁶

Conventional airpower

Armed forces

Following the revolution, Iran's armed forces changed drastically. Khomeini quickly consolidated power by purging the Shah's top military leaders, shrinking the regular military, separating revolutionary militant groups from the military, and establishing a large reserve force. At the top, the Supreme Leader remains the commander in chief of the armed forces as assigned in the constitution of 1979.⁷

Today, two separate entities form the armed forces, the IRGC and the Islamic Republic of Iran Army (IRIA). The IRGC derives its lineage from the revolutionary

militant groups that brought the regime to power and remains the most influential military organization in the country. It is primarily responsible for the regime's survival, but owing to its importance, it also performs overseas operations and controls the country's nuclear and ballistic missile programs.⁸ The IRGC includes ground, naval, air, space, and paramilitary elements. Separate from the IRGC, the IRIA is the regular arm of the Iranian military including a ground force (IRIGF), a naval force (IRINA), an air force (IRIAF), and an air defense force (IRIADF) independent of the IRIAF.⁹ The IRIA's primary mission is defending the nation.¹⁰ While the IRGC is significantly smaller than the regular forces, it enjoys approximately two thirds of the defense budget with the remaining one third going to the IRIA.¹¹

Iran's military doctrine and strategy seem to focus primarily on defense but often appear aggressive to deter outside actors and pursue the regime's ideological and political goals.¹² In the years since the revolution, arms sanctions regimes significantly affected modernization of Iran's conventional capabilities. In response to Iran's nuclear program, the UN imposed a series of arms controls between 2006 and 2010. The controls limit transfer of technology related to nuclear weapons as well as exports or imports of conventional weapons. In 2015 the sanctions were modified but United Nations Security Council (UNSC) approval is still required for Iran to purchase major conventional weapons.¹³ Moreover, recent modernization efforts are grounded in a realization that existing conventional capabilities are insufficient to deter adversaries.¹⁴ Evidence suggests that Iranian support for asymmetric and unconventional warfare, including missile technology, naval mines, and irregular operations, is partially intended to compensate for conventional deficiencies.¹⁵ Therefore, asymmetric and unconventional capabilities are likely to remain a critical part of Iran's defense doctrine until conventional capabilities improve.

Air and air defense forces

Iran's airpower capabilities are found throughout the organizational structure with fixed-wing aircraft heavily concentrated in the IRIAF. The bulk of the Air Force's approximately 330 assets are garrisoned in the western region near the border with Iraq.¹⁶ However, Iran also bases combat aircraft in the southern region along the Persian Gulf, often hosting deployments to this area.¹⁷ Several IRIAF airbases also exist in the eastern region, near the Afghan border, but these are primarily forward-operating bases capable of hosting deployments with limited existing equipment.¹⁸ Beyond the regular Air Force, the IRGC Air and Space Force (IRGCASF) operates about 105 aircraft including approximately 50 fixed-wing aircraft and 55 helicopters tasked mainly with close air support and logistical airlift missions.¹⁹ The IRGCASF also has the important job of overseeing ballistic missile programs and capabilities, due to the asymmetric advantage missiles offer.²⁰ Worried about possible airstrikes on Iranian nuclear sites, in 2008 the Ayatollah directed the establishment of the IRIADF, independent from the Air Force.²¹ Tasked to deal with any threat to the country's airspace, the

IRIADF provides centralized control over all air defense units.²² Overall, the organizational structure of Iran's airpower reflects a doctrinal intent to use airpower primarily as a means to defend against foreign aggression while maintaining limited long-range strike capabilities to repel an invasion or to retaliate.²³

In comparison to Iran's neighbors, the IRIAF is qualitatively weak but enjoys an advantage of strategic depth. Across the IRIA and IRGC, airpower capabilities suffered greatly under decades of sanctions. Aircraft built in the US and sold to Iran before the revolution still form the backbone of the IRIAF combat fleet. Approximately 70 percent of Iran's active combat aircraft are variations of the F-4 Phantom II, F-5 Tiger II, or F-14 Tomcat multi-role fighters used for air defense and ground attack.²⁴ In 1990, Iran managed to supplement its US inventory with Soviet-built fighters that Saddam Hussein sent from Iraq during the Gulf War.²⁵ Since then, US systems have suffered from a lack of parts and maintenance to a greater degree than other fighters like the IRIAF's Soviet-built Su-24s and MiG-29s, Chinese J-7s, French Mirage F-1s, and the IRGCASF's Su-25s and newly upgraded Su-22s. The IRIAF keeps as many aircraft serviceable as possible by cannibalizing them, producing local parts, reverse engineering, and, in some cases, procuring parts covertly.²⁶ Unsurprisingly then, many of Iran's US systems are no longer airworthy, or require long maintenance times between sorties.²⁷ In contrast to qualitative shortfalls, Saudi Arabia is Iran's only neighbor to field more combat aircraft with a 365 to 334 advantage. The rest of the GCC states field a combined combat aircraft strength of only 336.²⁸ Additionally, Iranian pilots reportedly still receive around 160–190 flight hours per year, which closely approximates other air forces.²⁹ While individual GCC states enjoy newer and more advanced aircraft with dependable logistics and maintenance, in a conflict they would face Iranian airpower capable of absorbing acceptable losses while remaining combat capable. However, if the GCC fought together, with Saudi Arabia, Iran's airpower depth could be easily overwhelmed.

Iran's Integrated Air Defense System (IADS) capabilities are arrayed for point defense to protect critical military and regime sites, including suspected nuclear program locations.³⁰ Integrated networks of fighter aircraft, air surveillance systems, ground-based surface-to-air missile systems (SAMs), and command and control (C2) nodes form a nation-wide architecture to deter and fend off would-be aggressors. Iran depends mainly on a ground-based radar network to monitor its airspace while identifying and tracking unknown aircraft.³¹ The IRIAF's most capable air-to-air fighters, F-14s and MiG-29s, provide redundancy and fill in areas where SAMs are unable to protect.³² The IRIADFs most capable land-based air defense system, the SA-20, came online in 2017 following a long-awaited delivery from Russia.³³ With four operational batteries, the SA-20 provides Iran its first advanced long-range SAM in decades, complicating all but the world's most sophisticated combat aircraft.³⁴ Iran's other strategic land-based SAMs include four Soviet-built 1960s era SA-5s and four Chinese-upgraded 1950s era SA-2s, neither of which offers significant defense against an advanced adversary.³⁵ In addition to strategic SAMs, the IRIADF also employs the Soviet-built 1980s era SA-15, providing road-mobile protection of critical

sites from low to medium altitude aircraft and other weapon systems like cruise missiles, helicopters, and Unmanned Aerial Vehicles (UAVs).³⁶ Finally, Iran also boasts large numbers of tactical and shoulder-mounted air defense systems and about 2,000 anti-aircraft artillery (AAA) guns.³⁷

Highlighting the importance of air defense to its defense doctrine, proficiency is reinforced through training and exercises. Beyond just F-14s and MiG-29s, most of the IRIAF's combat squadrons are also trained to provide air defense.³⁸ Almost every air exercise emphasizes defense of Iranian airspace, including cooperation between airborne and ground-based systems.³⁹ Exercises show a sophisticated effort by Iran to team surveillance, mobile, and strategic SAMs and fighters to ambush attacking aircraft and even go after adversaries' high-value standoff air platforms.⁴⁰ An independent IRIADF, using sophisticated integration tactics like these and bolstered by new or upgraded systems, presents a respectable deterrent to neighbors but is still unlikely to significantly hinder a large-scale aerial attack from an advanced foe such as the United States.

Despite decades of sanctions, Iran maintains a concerted program to modernize airpower across its armed forces. With priority toward keeping aging platforms airworthy into the 2020s, Iran also modified its aircraft with a new air-to-air refueling system that extends combat range and capability.⁴¹ As recently as 2018, the IRGC received ten former Iraq Air Force Su-22s, now refurbished, capable of both air-to-air and air-to-ground operations.⁴² The newly modified Su-22s can reportedly share data from UAVs and be modified for anti-ship capability in the future.⁴³ Iran is also heavily investing in indigenous fighter development programs including the Saeghe and Saeghe-2, which are air-to-air and air-to-ground aircraft closely resembling the F-5 aircraft still prevalent in the IRIAF inventory. The Saeghe is a single-seat version while the Saeghe-2 is a two-seat version with Iran self-reporting improved power, mobility, navigation, payload, and operational range in the twin-seat variant.⁴⁴ Recent exercises also show the Saeghe providing additional aerial reconnaissance capability.⁴⁵

The Kowsar is another indigenously produced aircraft Iran recently unveiled that also closely resembles the physical characteristics of the F-5.⁴⁶ While the Kowsar and Saeghe platforms represent Iran's first indigenously produced combat aircraft, a cursory review indicates they are the result of heavily reengineered F-5s the IRIAF has operated for decades. Despite physical similarities, little is known about reported avionics upgrades. In 2013, Iran unveiled a mock-up of a future advanced stealth aircraft it called the Qaher F-313. Another mock-up was shown conducting taxiing tests in 2017.⁴⁷ After both displays, airpower experts from around the world voiced criticism and doubt that the F-313 was anything more than a model intended as propaganda.⁴⁸ Despite sanctions, Iran has successfully kept an aging fleet of combat aircraft airworthy while investing heavily in indigenous programs. However, programs such as the Saeghe, Kowsar, and Qaher indicate a dubious future at best. At worst, they show that Iran's indigenous efforts will not generate real improvement in combat airpower capabilities.

Given Iran's limited aerospace industry, substantial airpower improvement is probably only possible outside the bounds of existing arms control limitations.⁴⁹

Overtures to France, China, and Russia indicate Iran is aware that international arms procurement offers the best opportunity to modernize. In 2015, press reports indicated that Iran had agreed to purchase 150 J-10 advanced fighters from China.⁵⁰ At about the same time, Iran also considered purchasing modern French fighters.⁵¹ Then in 2016, reports surfaced of a possible agreement between Russia and Iran to purchase, or co-produce, advanced Su-30 fighter aircraft.⁵² Any large purchase of modern fighters, regardless of source, would provide Iran with significant improvement in both air defense and long-range strike capability, bolstering deterrence. Advanced fighters bring more power, longer range, improved avionics, and more lethal weaponry. However, despite efforts to broker purchase agreements, as of this writing, nothing has materialized.

Beyond frontline combat fighters, Iran's modernization efforts indicate a desire for new and improved trainer, refueler, logistics, and intelligence, surveillance, and reconnaissance (ISR) platforms. Reporting indicates the Kowsar indigenously produced airframe may serve as the next trainer but Iran may buy a Russian aircraft as its primary trainer when the arms embargo is eventually lifted.⁵³ The IRIAF continues to overhaul US-built Lockheed Martin C-130 Hercules cargo aircraft and its KC-707 tanker refuelers, and desires to replace them with newer aircraft in the long run.⁵⁴ The future of manned ISR in Iran's armed forces looks bleak with their only known development program, the IrAn-140 Maritime Patrol Aircraft, grounded since 2014 due to technical deficiencies.⁵⁵

In contrast to its manned programs, Iran remains heavily invested in unmanned ISR with at least two indigenous UAV programs fielded and several others in development. Since at least 2014, the IRGC has operated the Shahed-129 UAV with a reported 24-hour endurance and air-to-ground armament capability.⁵⁶ The Ababil UAV family of systems includes short and medium-range platforms conducting ISR and maritime patrols, and also serves as air defense targets.⁵⁷ In the last several years, UAVs emerged as central to IRGC operations abroad in Yemen, Sudan, Iraq, and Syria. Early variants of the Ababil have been operating throughout the Middle East since 2012 with reports of Ababil, or similar Iranian UAVs, crashed or shot down in Syria and Sudan on multiple occasions.⁵⁸ The Hamaseh is another indigenous UAV with a higher maximum altitude capable of carrying signals intelligence sensors and air-to-ground armaments. Most interestingly, the Hamaseh may be Iran's first UAV to boast beyond-line-of-sight satellite communications capability, a marked technological leap forward.⁵⁹ Various press and industry reporting indicates Iran may have successfully flown a reengineered version of the American RQ-170 wing-shaped UAV.⁶⁰ However, beyond the unique shape, the UAV's specific combat capabilities remain unclear. With the exception of promising UAV advances, Iran's airpower capabilities will continue to suffer with only marginal improvements while UN sanctions remain in place.

In the realm of open source information, several questions remain regarding the operational efficacy and capabilities of Iranian airpower. To what degree will local production, even 3D printing advancement, keep aging airframes operational? Beyond cursory understanding and public statements by Iranian officials,

to what degree are the IRIAF, IRIADF, and IRGCASF capabilities and C2 elements interoperable with one another and the other elements of the armed forces? Interoperability between the IRIA and the IRGC is desired but progress is still unclear in this area.⁶¹ Beyond somewhat dated information about available flight hours, how proficient are Iranian pilots in complex and uncooperative air-to-air scenarios? Are Iranian fighter pilots adept at operating in heavy electronic warfare environments? Detailed information and understanding in these areas would offer insights into Iran's air forces beyond simple intent, orders of battle, and modernization efforts, and provide clearer evidence about the state of Saudi, GCC, and US qualitative advantages.

Overall, Iran's airpower organization, training, and equipment provide capabilities in support of its strategic goals. Beyond the less important mission of spreading the revolution via unconventional warfare, conventional airpower represents a unique capability to defend the Islamic Republic's sovereign territory from outside intrusion. The IRIAF and IRIADF provide an integrated air defense system designed to deter would-be aggressors. Signaling Iran's vision for airpower's role in deterrence, while unveiling its newest indigenous aircraft, in 2018 Iranian President Hassan Rouhani stated, "Our weapons and the preparedness of our military forces should be on a level where nobody dares to attack us."⁶² But conventional airpower, of course, does not provide the ultimate deterrent against more powerful external foes.

Iran and the bomb

Is Iran seeking a nuclear weapons capability and, if it acquired one, how would it use it to advance its national security objectives? These two questions are crucially important for the security and stability of the Middle East. The history of Iranian nuclear ambitions preceding the Joint Comprehensive Plan of Action (JCPOA) can be told most conveniently with reference to the events of 2002, at which time the international community became broadly aware of two undeclared Iranian nuclear labs located at Arak and Natanz.⁶³ As a 1968 signatory to the Nuclear Non-proliferation Treaty (NPT), Iran retained the right to develop a peaceful, civilian nuclear program while committing not to acquire nuclear weapons.⁶⁴ However, Tehran had declared neither the plutonium enrichment facility at Arak nor the uranium enrichment at Natanz to the International Atomic Energy Agency (IAEA), as required. While the existence of these sites is not definitive proof of a nuclear weapon program, Iran's failure to disclose these sites (and other nuclear-related activities) led many observers to conclude that Arak and Natanz were intended for military purposes.⁶⁵

Suspicion that Iran was pursuing nuclear weapons increased when the United States obtained an Iranian laptop containing evidence, which US officials briefed to IAEA leaders in 2005, that Tehran had studied how to place a compact nuclear warhead on its Shahab rockets.⁶⁶ Such suspicions led the United States and its allies to introduce additional economic sanctions, employ cyber attacks to slow Iranian centrifuges, and engage diplomatically to stymie Tehran's

enrichment efforts. Distrust of Iran continued despite a 2007 finding by the US National Intelligence Council that Tehran's nuclear weapons program – narrowly defined – had halted in 2003. According to this restrictive conceptualization, countries do not have a “nuclear weapons program” even if they harbor ambitions for nuclear weapons and acquire fissile material while developing advanced delivery vehicles in pursuit of a nuclear capability, so long as they abstain from “nuclear weapon design and weaponization work and covert uranium conversion-related and uranium enrichment-related work....”⁶⁷

The standoff culminated in July 2015 when the United States, Iran, and other powers signed the JCPOA, an international agreement intended to ensure that Tehran's nuclear activities were entirely peaceful. The JCPOA's provisions were envisioned to govern Iranian nuclear activity in a phased manner: some parts would expire on a set timeline while other provisions would persist in perpetuity. In essence, the deal provided for the elimination of nuclear sanctions and the release of frozen Iranian funds in exchange for Iran's verifiable commitment to curtail the number of installed gas centrifuges, drastically reduce the stockpile of low-enriched uranium, and restrict the level of enrichment to very low-levels for the next 15 years.⁶⁸

The Trump administration unilaterally withdrew from the JCPOA in May 2018, citing evidence from surreptitiously obtained Iranian documents that, it alleged, proved that Iran had negotiated the agreement in bad faith.⁶⁹ This evidence, provided by Israeli intelligence and presented publicly by Israeli Prime Minister Benjamin Netanyahu, consisted of more than 100,000 pages of Iranian documents from 1999 to 2003. The records documented covert efforts to achieve a nuclear weapon capability and made clear that the “stop work” order did not “halt” all nuclear weapons research in 2003, among other revelations.⁷⁰ Whereas the administration used the records to justify withdrawing from the agreement, for JCPOA supporters the documents merely confirmed earlier assessments that had made the JCPOA necessary in the first place.⁷¹

The discussion that follows does not attempt to resolve debates over the merits of the deal or to recount or explain the evolving post-JCPOA security environment. Rather, we offer two analytical lenses for understanding Iranian nuclear behavior. The first examines how Iran has pursued a nuclear weapon capability; the second reveals factors that constrain Iranian decision-making regarding the employment of nuclear weapons. The goal of this discussion is to offer policymakers tools to improve their understanding of ongoing developments and to anticipate future Iranian nuclear behavior.

Nuclear hedging

Scholars Wyn Bowen, Matthew Moran, and Dina Esfandiary provide a sophisticated conceptual account of “nuclear hedging,” which they draw on to elucidate Iran's efforts to achieve a nuclear weapon capability. Too little is known about Iranian decision-making and clandestine behavior to justify Lawrence Freedman's claim that the book will stand as the “definitive study of the nuclear deal with

Iran,” yet the study does provide valuable conceptual foundations for assessing Iranian behavior.⁷² For the authors, nuclear hedging is closely related to but ultimately different than the concept of nuclear latency. Many countries with civilian nuclear programs have an associated latent potential to develop nuclear weapons. Nuclear hedging, by contrast, refers to what Ariel Levite describes as “a national strategy of maintaining, or at least appearing to maintain, a viable option for the relatively rapid acquisition of nuclear weapons, based on an indigenous capacity to produce them in a relatively short time frame ranging from several weeks to a few years.”⁷³ Leaders engaged in nuclear hedging are “hedging their bets” on whether to acquire nuclear weapons. The critical difference between latency and hedging comes down to the state’s intentions regarding acquisition.⁷⁴

Nuclear hedging is revealed by three indicators. First, hedgers deliberately pursue technical capabilities well beyond those needed for civilian nuclear programs while concertedly seeking to hide these pursuits from the outside world. Second, they create and maintain a coordinated national narrative, aimed at domestic audiences, that frames the pursuit of nuclear capabilities as a matter of national identity and sovereignty. Third, hedgers engage diplomatically to portray themselves as NPT-compliant non-nuclear weapon states. Iran has consistently demonstrated each of these hedging behaviors.⁷⁵

Tehran has pursued technical capabilities well beyond those needed for a civilian program and has sought to obscure the purpose of these activities. For example, despite holding 9 percent of the world’s total oil reserves and the fourth biggest proven reserves, Iran has consistently claimed its civilian nuclear research is driven by a need to develop alternate forms of energy. This rationale, suitable to explain enrichment up to levels of about 5 percent, does not explain Iran’s 2010 initiative to produce moderately enriched uranium (MEU) at the 20 percent level. When enriched to 20 percent, 90 percent of the work required to reach weapons-grade uranium has been completed. The rationale that enrichment is required for domestic energy purposes is undermined by the fact that, while enrichment activities had been established and rapidly expanded, the Iranians were years away from operational use of their planned nuclear reactors.⁷⁶

Iran has also established a coordinated national narrative, aimed at domestic audiences, that frames the pursuit of nuclear capabilities as a matter of Iranian sovereignty, prosperity, and self-determination. Tehran has emphasized the domestic economic opportunities of an expanded nuclear program, promising that “countries with a nuclear fuel cycle will export energy around the world,” in turn “gaining a very high income by doing so.” President Mahmoud Ahmadinejad framed efforts to limit the nuclear program as an attempt by foreign powers to impose “nuclear apartheid” on Iran. President Hashemi Rafsanjani asserted that advancing nuclear capabilities is a matter of defending Iran’s “right, its nation, and its revolution.”⁷⁷

Finally, Tehran emphasizes before foreign audiences that it is fully compliant with its international obligations. The IAEA has found Iran in violation of its safeguards obligations and referred Iran’s infringements to the UNSC for

enforcement, yet Iran dismisses the legal validity of the IAEA's findings while portraying itself the victim. Iran presents Western opposition to its uranium enrichment activities as incompatible with Article IV of the NPT, which guarantees non-nuclear weapon state (NNWS) parties to the Treaty the right "to develop research, production and use of nuclear energy for peaceful purposes."⁷⁸ Iran interprets this language as providing a right to enrich uranium and has worked assiduously, and successfully, to convince the block of Non-Aligned Movement (NAM) countries and others of the correctness of this interpretation.⁷⁹

For Bowen, Moran, and Esfandiary, the interplay of these three indicators over time suggests a national hedging strategy. Iranian technical, narrative, and diplomatic behavior from 2002 through 2012 indicates an effort to achieve nuclear latency and the foundations for a nuclear weapon capability.⁸⁰ These authors are uncertain as to whether Iran has continued to practice nuclear hedging after 2012. For policymakers in 2019, faced with continuing uncertainties in a post-JCPOA environment, it is important not only to look for evidence of continued nuclear hedging by Tehran, but also to consider how Iran, once in possession of a nuclear capability, might attempt to leverage that capability to further its national security interests.

Nuclear posture

How, then, would a regional power like Iran employ a nascent nuclear weapons capability in pursuit of its strategic aims? Vipin Narang's landmark 2014 study on comparative nuclear strategy provides the natural starting place for thinking about how regional powers, such as Iran, select among potential nuclear strategies.⁸¹ In the discussion below, Narang's theory is applied to Iran to anticipate this country's likely nuclear weapons strategy. Narang writes that four variables affect which of three distinct nuclear postures a regional power will rationally choose.⁸²

The first key factor is whether the regional power has a reliable third-party patron. A third-party patron has far greater power than the regional state in question, and is likely a superpower. The ability of a regional power to appeal to a third-party patron for support can be "a decisive security determinant and deterrent to conventional aggression." The availability of a third-party patron inclines the regional power to a "catalytic" nuclear weapons posture in which the fundamental strategy is to induce or accelerate a superpower's intervention on the regional state's behalf. Iran lacks such a patron, and, therefore, has not been able to pursue this option.⁸³

The second key factor is whether the regional power is facing a conventionally superior proximate offensive threat. Lacking a third-party patron to guarantee its security, a regional state must make its own way. The severity of the immediate security environment facing the state determines its nuclear weapons posture. "In particular," writes Narang, "a state facing a conventionally-superior proximate offensive threat should have no option but to adopt an asymmetric escalation posture." The "asymmetric escalation" posture is a strategy by which

the regional power hopes to deter a conventional attack by its adversaries by threatening its own rapid first-use of nuclear weapons in any conflict. Does Iran face such an offensive threat? Not according to Narang. Narang's framework therefore identifies asymmetric escalation as a possible nuclear posture option for Iran, albeit not the only one.⁸⁴

The third key factor is whether the regional power's civil-military arrangements are "assertive" or "delegative." By "delegative," Narang means a condition in which management and authority for nuclear weapons is decentralized and "held loosely" among operational military commanders so that they are poised for responsiveness. Such decentralization is required for the asymmetric escalation posture. In contrast, "assertive" indicates an atypical condition in which management and authority are centralized and "held tightly" by the political regime. Assertive arrangements require the state to assume an "assured retaliation" posture. Under "assured retaliation," the regional power hopes to deter an adversary's nuclear attack or coercion by the presence of its own survivable second-strike nuclear force. The requirement for strict centralized control means that retaliation may not occur immediately. Narang observes that Iran's strategic weapons programs are managed by the IRGC, an elite force that enjoys significant delegated authority from Tehran.⁸⁵

The final key factor is whether the regional power is resource constrained. By "resource constrained," Narang refers to the regional power's "relative technological and economic capacity to develop all of the systems required" to assume an asymmetric nuclear weapons posture against its primary threat. If resources are sufficient, the regional power can adopt an asymmetric posture. When they are not, the optimal strategy is to adopt the relatively cheaper assured retaliation posture.

If Tehran acquires nuclear weapons and wishes to pursue the most "rational" deterrence strategy, then, according to Narang, it must devote the resources required for an asymmetric escalation posture, or, if resources are insufficient, develop an assured second-strike retaliation capability.⁸⁶ If a "conventionally-superior proximate offensive threat" were to emerge against Iran, then Tehran would endeavor to adopt a posture of asymmetric escalation. Under such a scenario, Tehran would pre-delegate authority for nuclear weapons use to the IRGC and devote considerable national resources in support of this expensive posture. But, in the absence of such a threat, Narang's theory cannot predict which of the two postures Iran would be most likely to take. His theory usefully reduces the number of likely Iranian postures to two general types, but, when all is said and done, it is indeterminate. Additional data is required to assess which of these dissimilar postures would be more likely to emerge in a nuclear Iran.

As mentioned previously, new information did come forth in May 2018, when Netanyahu made a public display of recently captured Iranian documents from the 1999–2003 period. Although the IAEA and international community already knew (or at least suspected) much of the information contained in these records, the documents nevertheless produced important revelations. One of the more interesting revelations is that sometime in the late 1990s or in 2000 the

Iranian leadership approved of a plan to construct five nuclear warheads, each having a yield of only 10 kilotons.⁸⁷

Some experts have expressed shock that Iran, after formally deciding to pursue the bomb, would pursue such an unusually low yield, for so few warheads, with such poorly designed delivery vehicles. “Don’t [the Iranians] have any self-respect,” asked arms control wonk Jeffrey Lewis. “This nuclear weapons program is insulting, in the idea of nuclear weapons programs” he added. The design for the nose cone on Iran’s Shahab 3 missile is, Aaron Stein ridiculed, the equivalent of “aiming for the Yugo of design.” Iran’s plan was limited to “keeping five bombs in the basement” in the manner of a “South African-style recessed deterrent,” Lewis concluded. If these analysts’ interpretation of the new evidence is correct, then Tehran may have been positioning itself to adopt a retaliation posture backed up by a stunningly modest arsenal.⁸⁸

But there is more than one way to read this evidence. A joint study by the Institute for Science and International Security and the Foundation for Defense of Democracies concluded that “the goal of producing five [bombs] should be viewed as an initial one.”⁸⁹ The surprisingly low goals for yield and number of warheads may have been set, a Harvard study suggests, “because Iranian technical experts were confident that they could meet them, even if they ultimately had higher ambitions.”⁹⁰ While the new evidence has failed to generate consensus about how many nuclear weapons the regime desired or how it would use them, it seems clear that from at least 2000 through 2003, Tehran sought nuclear weapons rather than merely the ability to construct them at short notice.

Conclusion

Iranian airpower plays, and will continue to play, a significant role in Tehran’s efforts to deter attack, defend sovereign territory, preserve the regime, and spread the revolution via unconventional warfare. However, Iran’s air forces are severely hampered by decades of arms control and aging equipment. Iran’s limited ability to project combat airpower far beyond its borders obliges it to rely on airpower as primarily defensive in nature, emphasizing point defense of strategic sites. Iran suffers from a qualitative disadvantage vis-à-vis its neighbors, which will grow with every year that Tehran remains under the UN arms embargo while its neighbors continue to modernize. If it is ever able to escape existing arms sanctions, modernization of its conventional capabilities will take at least a decade. Therefore, without significant outside assistance, Iran’s air force will remain unable to offer a prolonged defense against a more technologically advanced adversary.

Iran’s conventional weaknesses have contributed to its reliance on asymmetric and unconventional capabilities, as well as its pursuit of a nuclear weapons capability. Iran’s behavior over several decades has been consistent with a strategy of nuclear hedging. As newly available documents reveal, however, Tehran sought possession of nuclear weapons – and not merely a break-out capability – for at least several of these years. Space constraints prevent us from

speculating on how Iranian nuclear behavior will evolve in the post-JCPOA environment.

Notes

- 1 The opinions, conclusions, and/or recommendations expressed or implied within this chapter are solely those of the authors and should not be interpreted as representing the views of the Air War College, the Air University, the US Air Force, the US Department of Defense, or any other US government agency.
- 2 Pence, 2019.
- 3 Ward, 2009, p. 212.
- 4 Limbert, 2009, pp. 16, 31–32.
- 5 Pollack, 2013, pp. 9–12; Tabatabai and Samuel, 2017, p. 157.
- 6 Pollack, 2013, pp. 26–31; Tabatabai and Samuel, 2017, p. 170.
- 7 Ward, 2009, pp. 228–230.
- 8 Anon., 2018b.
- 9 Anon., 2018b.
- 10 Lechowicz, 2016, p. 5.
- 11 Anon., 2018b; Katzman, 2018, p. 18.
- 12 Anon., 2018b; Pollack, 2013, p. 22.
- 13 Stockholm International Peace Research Institute, 2016.
- 14 Anon., 2018b.
- 15 Anon., 2018b; Katzman, 2018, p. 16; Tabatabai and Samuel, 2017, p. 156.
- 16 Anon., 2018a, p. 5; Lechowicz, 2016, p. 10.
- 17 Anon., 2018a, p. 8.
- 18 Anon., 2018a, p. 7.
- 19 Anon., 2018a, p. 5.
- 20 Anon., 2018a, p. 6.
- 21 Anon., 2018a, p. 6.
- 22 Anon., 2018a, p. 6.
- 23 Anon., 2018a, p. 11.
- 24 Anon., 2018a, p. 18.
- 25 Anon., 2018a, p. 12.
- 26 Anon., 2018a, p. 14.
- 27 Anon., 2018a, p. 14.
- 28 Cordesman and Harrington, 2018, p. 4.
- 29 Anon., 2018a, p. 12.
- 30 Anon., 2018a, p. 3.
- 31 Anon., 2018a, p. 7.
- 32 Anon., 2018a, p. 3.
- 33 Anon., 2018a, p. 7.
- 34 Anon., 2018a, p. 7.
- 35 Anon., 2018a, p. 6.
- 36 Anon., 2018a, p. 7.
- 37 Anon., 2018a, p. 6.
- 38 Anon., 2018a, p. 4.
- 39 Anon., 2018a, p. 12.
- 40 Anon., 2018a, p. 3.
- 41 Anon., 2018a, p. 14.
- 42 Johnson, 2018.
- 43 Anon., 2018a, p. 15.
- 44 Anon., 2018a, p. 13.
- 45 Anon., 2018a, p. 13.

- 46 Cenciotti, 2018.
- 47 Anon., 2018a, p. 14.
- 48 Dudley, 2018.
- 49 See the Dudley article, and Dudley's sources, for more information on Iran's limited aerospace industry.
- 50 Gady, 2015.
- 51 Iddon, 2018.
- 52 Dareini, 2016; Gady, 2016a, 2016b.
- 53 Anon., 2018a, p. 17.
- 54 Anon., 2018a, p. 15.
- 55 Anon., 2018a, p. 16.
- 56 Anon., 2018a, p. 16.
- 57 Anon., 2018a, p. 16.
- 58 Anon., 2018a, p. 16.
- 59 Anon., 2018a, p. 17.
- 60 Opall-Rome, 2018; Zwijnenburg, 2018.
- 61 Anon., 2018b.
- 62 Fitch and Eqbali, 2018.
- 63 Esfandiary et al., 2016, p. vii.
- 64 United Nations, 1974, NPT, Article III, par. 1–4 and Article IV, par. 1–2.
- 65 Pollack, 2013, p. 37.
- 66 Broad and Sanger, 2005.
- 67 National Intelligence Council, 2007.
- 68 Esfandiary et al., 2016, pp. 1, 5–6.
- 69 Trump, 2018.
- 70 Arnold et al., 2019.
- 71 Belfer Center, 2018.
- 72 Esfandiary et al., 2016, back cover.
- 73 Levite, 2002, p. 69.
- 74 Esfandiary et al., 2016, pp. 7, 16, and 29.
- 75 Esfandiary et al., 2016, pp. 34–38.
- 76 Esfandiary et al., 2016, pp. 48 and 53.
- 77 Esfandiary et al., 2016, pp. 67, 73, and 76.
- 78 United Nations, 1974.
- 79 Esfandiary et al., 2016, pp. 110–112 and 118.
- 80 Esfandiary et al., 2016, pp. 168–170.
- 81 Narang, 2014. On the seminal nature of this study, see the endorsements on the book's back cover.
- 82 Narang, 2014, pp. 2, 10–11, and 32.
- 83 Narang, 2014, pp. 4, 15, 31, 33, and 304.
- 84 Narang, 2014, pp. 19, 35, and 304.
- 85 Narang, 2014, pp. 36–37 and 304–305.
- 86 Narang, 2014, pp. 39–40.
- 87 For a short overview of the revelations, see Arnold et al., 2019.
- 88 Lewis, 2018.
- 89 Albright et al., 2018.
- 90 Arnold et al., 2019, p. 22.

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14 The Gulf Cooperation Council¹

Joseph Kéchichian

Introduction

Despite their relative youths as independent nation-states, the conservative Arab Gulf Monarchies (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates [UAE]), which created the Gulf Cooperation Council (GCC) alliance in 1981, drew global attention because of their oil and gas wealth. Regrettably, they could not protect the Arabian Peninsula from predators, which necessitated global associations and coalitions. Naturally, it was the importance of petroleum that catapulted them to the forefront of international economic systems, while Arab as well as non-Arab revolutions threatened internal, regional, and global security. Few outsiders factored in their calculations the need to preserve traditional values, though ruling families intended to shield their nations from various upheavals. To be sure, instability preoccupied leading Western powers too, but only in so far as the latter's interests were challenged, as local elites aligned themselves with powerful global actors. Interestingly, few denied that the Arab Gulf States were poised to redraw the political landscape of the entire Middle East because of their wealth, and that they deserved – and could afford – to purchase the wherewithal to defend their countries, even if significant differences existed between the preservation of prevailing authorities with the inevitable militarization that occurred during the past five decades.

With limited populations, the six Arab Gulf monarchies, which encompassed 12 ruling families – on account of the seven that co-existed within the UAE federation – painstakingly learned to trust each other, managed their internal affairs with relative poise, and entered into effective alliances with the United Kingdom, France, and, especially, the United States, all three of which assumed critical defense burdens to deny the natural wealth of the Arabian Peninsula to the Soviet Union at the height of the Cold War and to Iran ever since.

It was important to recall that acute competition over oil and gas resources starting in the mid-1970s, culminated in the 1990–1991 War for Kuwait, which was followed in 2003 with the U.S. invasion and occupation of Iraq although more than one reason drew Washington into that quarrel. As discussed by one of the most astute observers of the region, the twentieth century

was marked by a series of developments that pitted great powers against each other, chiefly to preserve and protect critical oil resources as well as advance what presumably the international community desired – to have secure access to vital resources at reasonable prices – even as oil costs fluctuated widely.² Long before the conservative Arab Gulf monarchies joined hands to assume part of the defense burden, vast sums were devoted to military expenditures, required to protect critical fields, pipelines, refineries, and transportation installations. With negligible indigenous populations, estimated at around 36 million in 2019, few could acquire the necessary land and naval forces to defend the vastness of the Arabian Peninsula, which stood at 3,237,500km² (1,250,000sqmi), and which was the primary reason why it was critical to invest heavily in their nascent air forces – notwithstanding the technical complexities associated with the service.

This chapter evaluates the value of airpower in the Arab Gulf States, focusing on some of the contemporary perspectives that the conservative states share, including permanent or long-term interests and objectives. It then examines existing military capabilities asking how have the six GCC governments fared in developing their airpower assets, and whether these have met member-states' goals. Likewise, it was fair to ask whether the ongoing ideological dispute with Qatar affected the alliance's long-term viability, and if the GCC countries could effectively defend their realms. In the end, it was pertinent to raise the key lasting questions that were and remain on every leader's mind: can Saudi Arabia salvage the GCC and transform the alliance into an effective union that will truly defend the conservative monarchies?

The Arabian Peninsula and the Gulf region

According to the International Institute for Strategic Studies (IISS) and the Stockholm International Peace Research Institute (SIPRI) military expenditure databases, which are based on open sources, GCC States spend about \$100 billion a year on defense, just behind the United States and China, though conservative Arab monarchies were entrusted with the protection of the entire Arabian Peninsula and its immediate surrounding airspaces and sea-lanes (see Table 14.1). This was a hefty investment, of course, but the Arabian Peninsula stretches over a very large area and is inhabited, in addition to its 36 million indigenous inhabitants, by an additional 22–24 million expatriate workers – for a grand total of nearly 60 million individuals in 2019. To be sure, most of the land is desert and unsuitable for human habitation, though the coasts as well as isolated oases are extensively used in a variety of ways, even if urbanization is now well entrenched.

All six GCC States invested in extensive infrastructures, including vital desalination plants that provide sorely needed water for human, animal, and plant consumption. As stated in the introduction, the Arabian Peninsula is rich in oil, with nearly 500 billion barrels of proven oil reserves and 1,491 trillion cubic meters of natural gas (see Table 14.2), which need to be defended too. In addition to

Table 14.1 GCC military expenditures – 2018

Country	<i>IISS</i>	<i>SIPRI</i>
	(US\$ millions)	(US\$ millions)
Bahrain	1,480	1,397
Kuwait	6,180	6,831
Oman	8,950	8,687
Qatar*	—	—
Saudi Arabia	82,900	69,413
United Arab Emirates**	—	—
Total***	99,510+	86,328+

Sources: International Institute for Strategic Studies, *The Military Balance 2019*, London: Routledge, 2019; and SIPRI Military Expenditure Database, “Military expenditure by country, in constant (2016) US\$ m.,” Stockholm: SIPRI, at www.sipri.org/sites/default/files/1_Data%20for%20all%20countries%20from%201988%E2%80%932017%20in%20constant%20%282016%29%20USD.pdf

Notes

* = Data for Qatar is highly unreliable and used to average between US\$5 and 6 billion per annum during the past few years though Doha placed orders for nearly \$18 billion in 2018 alone.

** = Data for the UAE is unreliable but various estimates place it at around US\$20 to 22 billion per annum.

*** = Actual data is probably somewhere between US\$100 and 125 billion.

Table 14.2 GCC proven oil and gas reserves – 2018

Country	<i>Proven oil reserves</i>	<i>Proven gas reserves</i>
	(Billion barrels)	(Trillion cubic meters)
Bahrain*	124.6 million	3
Kuwait	101.5	65
Oman	5.4	30
Qatar	25.2	890
Saudi Arabia	266.2	288
United Arab Emirates**	97.8	215
Total	496.22	1,491

Source: *The Oil and Gas Year*, UAE, at www.theoilandgasyear.com/markets/. See also Index Mundi, Natural Gas Reserves, at www.indexmundi.com/energy/?country=ae&product=gas&graph=reserves.

Notes

* = In May 2018, Manama announced its biggest discovery of hydrocarbon deposits in decades, estimated to be at least 80 billion barrels of tight oil and between 10 and 20 trillion cubic feet of deep natural gas. See: Holly Ellyatt, “Bahrain is betting on 80 billion barrels of oil to help clear its budget deficit,” *CNBC*, 8 May 2018, at www.cnn.com/2018/05/08/bahrain-discovery-of-80-billion-barrels-of-oil.html.

** = Data is for Abu Dhabi though both Sharjah and Ras al-Khaymah have modest oil and gas fields too.

these precious water and oil resources, GCC States must also protect and defend large cities, critical electricity grids, airport installations, land, air, and naval bases, as well as a myriad other vital facilities. Naturally, oil installations need special defense equipment, and though most are in remote locations, all demand

skilled personnel trained to protect these facilities until assistance reaches them in case of attacks.

Nothing is more important than GCC populations, however, as millions of residents in urban zones toil under difficult conditions. They are and will remain the priority though global, regional, and even local tensions place them in jeopardy. In fact, GCC States confronted sharp strategic challenges after 1981, and continue to experience them nearly four decades later. Sectarian, ethnic, and ideological divisions, all of which grew in scope in recent years, added to existing vulnerabilities with a major regional foe determined to upset the stability applecart. Repeated Iranian interferences in the internal affairs of GCC States, necessitated heavy investments at home, aware that limited populations prevented the establishment of effective security forces. Even worse, and again for the same pressures that a limited population placed on any country's socioeconomic needs, GCC member-states tolerated their limited military competences, though sharp improvements were recorded in recent years. If every GCC ruler relied on global allies to ensure regional security in the past, awakened nationalisms and core sovereignty questions have now shifted the burden on their shoulders, as a new generation of leaders assumed power. Between 1973 and 1979, which is to say between the first oil price hikes and the Iranian Revolution, Arab Gulf states invested meager resources in their militaries. After 1981, however, and especially after 2011, the GCC alliance gradually began to reevaluate every aspect of its defense liabilities. Coincidentally, Washington's gradual disavowal of its global responsibilities under the Obama Administration further pushed GCC leaders to assume security burdens, best illustrated by the War for Yemen that, for better or worse, shaped their perspectives on rapidly changing priorities. Yet, and as that conflict illustrated, limited military resources meant that various battles led by a lop-sided reliance on air assets failed to achieve a decisive victory against determined foes. Beyond the War for Yemen, what ailed Arab states were the multitude of dysfunctional entities, in which terrorist groups, militias, and non- or sub-state actors, flourished. All Arab governments, including the GCC States, recognized that the power of such groups grew in recent years, again with very limited use of conventional military capabilities to defeat low-intensity conflicts. In these instances as well, reliance on air forces was of limited value, though – and it is important to repeat this point – GCC leaders lacked the manpower to field large armies or, even better, the means to invest in special operations forces, notwithstanding tangible efforts that picked up pace after 2011.

Beyond the immediate threat of the War for Yemen that is raging as these lines are composed, what is the key long-term existential danger that the GCC countries confronted? How are the conservative monarchies, led by the Kingdom of Saudi Arabia – the alliance's largest and most powerful military – preparing to respond to looming dangers, in Yemen and elsewhere? While Arab Gulf monarchies do not want an open war with Iran, can they afford to remain idle against this formidable foe, especially when they sit on immensely vulnerable treasures, spread over vast and hard-to-defend territories?

The Iranian ideological challenge

Although a variety of ideological challenges preoccupied Arab Gulf leaders, ranging the gamut from Nassirism, Ba'athism, and Communism – some going so far as to add to this list the Muslim Brotherhood after the Arab uprisings that started in late 2010 – in reality, the single most critical ideological threat to GCC States was that posed by Revolutionary Iran.³ That threat, which was shared by all GCC ruling families and their populations, aimed to remove conservative Arab Gulf monarchies from power and to literally occupy Islam's holiest cities. To be sure, negative Iranian discourses on Saudi Arabia in general and Sunni Arabs in particular are long-standing and border on the bizarre. Yet, and in the aftermath of the 1979 Iranian Revolution and several unfortunate incidents in Makkah that resulted in the deaths of several hundred pilgrims, the (then) chairman of the Iranian parliament Ali Akbar Hashemi Rafsanjani issued one of his most virulent anti-Saudi declarations:

Iran must uproot the Saudi rulers, [he declared] ... and divest the control of the shrines from them.... The martyr's blood must be avenged by burning the roots of Saudi rulers in the region. The true revenge is to remove the colossal and precious wealth belonging to the Islamic world which lies under the soil of the Arabian Peninsula from the control of the criminal, the agents of colonialism. The Saudi rulers have chosen an evil path, and we will send them to hell.⁴

Ayatollah Ruhollah Khomeini echoed these words when he added:

Even if it were possible to forgive Saddam Hussein, it would never be possible to forgive Saudi Arabia ... these vile and ungodly Wahhabis, are like daggers which have always pierced the heart of the Muslims from the back ... Mecca is in the hands of a band of heretics.⁵

Analysts hoped that ties would improve after Khomeini passed away in 1989, though his last will and testament avowed:

Muslims should curse and fight tyrants, including and especially the Saudi royal family, these traitors to God's great shrine, may God's curse and that of his prophets and angels be upon them. King Fahd spreads a large part of the people's wealth every year on the anti-Koranic, totally baseless and superstitious faith of Wahhabism. He abuses Islam and the dear Koran. Curse this traitor to God.⁶

This was not simple prose but imbued an existential source of threat that, naturally, conservative Arab monarchists did not appreciate. As Iran increased its interferences in Arab affairs, President Mahmoud Ahmadinejad reasserted Iran's claims to the three occupied UAE islands and, of course, backed Shi'ah militias throughout the Arab World. King 'Abdallah bin 'Abdul 'Aziz asked then US ambassador to Iraq, Ryan Crocker, and Central Command [CENTCOM]

General David Petraeus to “cut off the head of the [Iranian] snake,” pushing for a military intervention against Iran in 2008, and accused Iran’s foreign minister Manouchehr Mottaki of “interfering in Arab affairs,” to which Mottaki replied “these are Muslims.” The king countered: “No, Arabs. You as Persians have no business meddling in Arab matters.”⁷

After 2011, and at the height of the Yemen crisis, Foreign Minister Ali Akbar Velayati backed the idea that Huthis should become to Yemen what Hizballah was and remains to Lebanon, with Iran’s help, which Ali Shamkhani, the secretary of Supreme National Security Council, clarified a few years later as he claimed that Iran enjoyed a military presence from the Mediterranean Sea to Bab al-Mandib. Ali Reza Zakani, Tehran city representative in the Iranian parliament, stated that:

With the fall of Yemen’s capital Sana’a under the control of Shiite Houthi militia, four Arab capitals have today ended up in the hands of Iran and belong to the Islamic Iranian revolution. The Yemeni revolution will not be confined to Yemen alone. It will extend, following its success, into Saudi territories. The Yemeni-Saudi vast borders will help accelerate its reach into the depths of Saudi land.⁸

Zakani and others believed that Makkah and Madinah belonged to the Muslim World as a whole and though the holy cities are ruled by Saudi Arabia, this should not be “an individual possession.”⁹ Even worse was what Ibrahim Karagül, the editor-in-chief of the Turkish newspaper *Yeni Şafak* and a hardline supporter of President Recep Tayyip Erdoğan, wrote in December 2017. Karagül provided his readers a peculiar reading of contemporary history, which was not all that surprising, but added insult to injury when he stated that Heir Apparent Muhammad bin Salman of Saudi Arabia and Abu Dhabi Heir Apparent Muhammad bin Zayid apparently “sold Jerusalem, [so] they will sell Mecca (*sic*) and Medina (*sic*) too.”¹⁰

Fantasy aside, Makkah and Madinah were not occupied territories, but part and parcel of the Kingdom of Saudi Arabia. The defense of the holy cities was the responsibility of Saudis and no one else, though assaults on the ruling family for assuming that burden was part of the ideological challenge that Iran – as the leader of minority Shi’ah Muslims searching for legitimizing power – and Turkey – as the successor State to the Ottoman Empire that once harbored leadership potentials – wished to assume for themselves. Both countries were aware that custodianship of the holy mosques granted the Al Saud unparalleled authority and immense legitimacy and both wished to strip the Saudi ruling family of those privileges. Of course, Riyadh was equally determined to hold on to these values, and to defend its privileges at all costs.

GCC airpower development

Against determined ideological challenges and with limited capabilities, GCC States relied on intrinsic forces to defend themselves, as most ushered in dramatic transformations. Although armies and navies recorded significant changes, GCC air

forces underwent spectacular alterations in recent years, growing in both sizes and stature. Beyond prestige aspects associated with the branch, airpower remained the most reliable service as GCC States sought to defend large territories, deter foes, and fill-in critical manpower shortages. Importantly, GCC air forces conducted numerous joint exercises and participated in multinational combat operations alongside United States Air Force (USAF), the United Kingdom's Royal Air Force (RAF), and the Armée de l'Air Française (AAF), among other coalition partners. In doing so, they demonstrated their professionalism and combat efficiency, as most matured while slowly developing competent air arms that gained inherent capabilities to embark on a broad spectrum of air power duties.

Before addressing intrinsic problems, ranging the gamut from training to operations, and raising key questions regarding manned and unmanned aircraft capabilities along with offensively and defensively capable ballistic and cruise missiles that are now deployed on and around the Arabian Peninsula, it may be useful to briefly sketch the six Arab Gulf air forces to get a feel for existing competences (see Table 14.3).

Royal Bahraini Air Force¹¹

The Royal Bahraini Air Force (RBAF, formerly known as Bahrain Amiri Air Force), is the aerial warfare branch of the Bahrain Defense Forces (BDF) and fielded about 1,500 personnel in 2019. The RBAF flew 38 combat capable aircraft, including 20 F-16C/D Falcons, 12 F-5E/F Tigers, and six Hawks, along with 28 attack helicopters, mostly Cobras. Bahrain's defense spending in 2018 was estimated at \$1.48 billion, as Manama moved to upgrade its defenses in response to the threats posed by regional foes.¹² Towards that end, and starting in 1982, the GCC provided Manama with \$10 billion spread over a decade to help improve its defenses, while the United States signed a Defense Cooperation Agreement in October 1991, granting US forces access to Bahraini facilities and ensuring the right to pre-position material for future crises. In 2003, Washington designated Bahrain as a major non-NATO ally of the United States and, since 2003, allocated over \$100 million in Foreign Military Sales (FMS) to pay for various high profile weapons systems. Upgrades to the helicopter force included new utility transports, including nine Black Hawks acquired through the FMS vehicle on 19 June 2007, and which are chiefly used on combat search and rescue missions.¹³ Recent purchases included 16 F-16 Viper Block 70 fighter aircraft in 2018, whose deliveries will start in 2021 and be completed in 2023. According to the RBAF Commander, Major-General Shaykh Hamad bin Abdallah Al Khalifah, these aircrafts would cost about \$2.78 billion, while Manama will allocate another \$1.1 billion to upgrade the existing fleet of 20 F-16s to the Viper configuration.¹⁴

Kuwaiti Air Force

The Al Sabah ruling family concentrated on sorely needed security requirements even before the Shaykhdom gained its independence on 19 June 1961. In 1957, the Public Security Force was reshaped and divided into two separate entities, as

Table 14.3 GCC air force capabilities – 2018

Country	Total military Strength Capable	Air force personnel	Equipment			
			Combat Capable	Transport	Training	Rotary wings
Bahrain	8,200	1,500	38	10	9	28
Kuwait	15,500	2,500	66	8	27	16
Oman	42,600	5,000	58	20	40	15
Qatar	11,800	2,000	18	18	27	34
Saudi Arabia	227,000	20,000	365	51+	161	15
ADF		16,000				30
SMF		2,500				
NG		100,000	18	23	12	
UAE	63,000	4,500	156	26	79	21
JAC		?	39	15	–	83
Total	486,600	35,500+	740	148+	343	230
						201
						18

Source: IISS, *The Military Balance 2019*.

Notes

ADF= Air Defense Forces

SMF=Strategic Missile Forces

NC=National Guard

JAC=Joint Aviation Command

the army graduated into the first branch of what became the Armed Forces. Two de Havilland Dove monoplanes entered into service that same year in what became the newly formed Air Force. The Kuwaiti Army endured its first formal alert following the 14 July 1958 coup d'état in Iraq that overthrew the monarchy and ushered into power a nationalist army brigadier, Abdul Karim Qasim, who seized military control of Baghdad. The fall of the Iraqi monarchy was a hard blow to Kuwait and other Gulf States, which further accelerated the search for fresh security measures. When Kuwait declared its independence after six decades of British protectorate, Iraq immediately claimed that Kuwait was actually an Iraqi province, and threatened to invade it to implement its claim.¹⁵ London flew airmen and landed marines into the newly independent country to forestall Iraq, in *Operation Vantage*, which probably prevented an Iraqi invasion at the time.¹⁶ Regrettably, the crisis graduated to the United Nations Security Council, where the Soviet Union vetoed the Kuwait application for membership. Moscow lifted its veto in 1963 but the experience strengthened the Kuwait resolve to build an effective military force including a capable air force to defend the Shaykhdom.

The Kuwaiti Air Force (KAF) acquired the iconic but subsonic British Hawker Hunter jet aircraft from Britain and the de Havilland DHC-4 Caribou transport aircraft from Canada in 1965. In 1969, the KAF purchased its first supersonic jet fighter aircrafts, the Lightning, as well as various Bell helicopters. British Strikemasters joined the growing fleet while the first Lockheed C-130 Hercules transport aircraft were added starting in 1970. By 1974, and as a result of unpredictable crises, Kuwaiti defense authorities enacted a new plan to expand their armed forces even further, as they introduced French-made Gazelle and Puma helicopters ideal for various coastal missions.

Kuwait merged the Air Defense component to the Kuwaiti Air Force as the country's Mirage F1s arrived in 1976. Whether an omen for future ties, and despite political differences that were colored by the Shaykhdom's balancing acts between Arab commitments and Western alliances, the military initiated its first close training exercises with the United States in 1979. It was not a coincidence that the Ahmad Al Jabir Air Base officially opened in 1979, a facility that seconded a sister property, the Ali Al Salim Air Base, which opened in 1980. Both welcomed new Douglas A-4 Skyhawk aircrafts, as the KAF retired its Lightnings and Hawker Hunters.

After 1981, the GCC alliance conducted joint military exercises, with air drills starting in 1983. In 1984, Kuwait acquired short-range tactical surface-to-air missiles, and was determined to defend itself as the Iran-Iraq War (1980–1988) spilled over. While the “Tanker War” attracted much international attention and some US intervention, Kuwait was caught in the middle of a glorified gamesmanship.¹⁷ After Iran blocked Iraqi oil exports through the vital Shatt-al-Arab waterway that delineated the border between the two antagonists, and as the war turned against the Iraqis, Kuwait authorized the use of its ports to supply Baghdad. The Shaykhdom, along with Qatar, Saudi Arabia, and the UAE, provided substantial financial aid to Iraq that, by some estimates, topped the \$60 billion mark. The Tanker War started properly in 1984 when Iraqi Air Force planes attacked

Iranian vessels and the vital oil terminal at Kharg Island, which led Tehran to retaliate by attacking tankers carrying Iraqi oil from Kuwait.

The lessons of the “Tanker War” were not lost on Kuwaitis who, perhaps, finally realized that the US was genuinely committed to defend the Shaykhdom and, for that matter, the entire Arabian Peninsula. In 1988, the KAF translated this newly found realization when it signed a major contract to purchase 32 F/A-18C and 8 F/A-18D Hornets, although none were delivered when Iraq launched the 1 August 1990 invasion of the Shaykhdom. In addition to the 40 Hornets, Kuwait purchased 16 Apache attack helicopters which started to arrive in February 2006. Lockheed Martin sold three KC-130J tanker aircraft to Kuwait with an option for three more to provide aerial refueling for the F/A-18 fleet. Importantly, the KC-130Js performed air mobility, disaster relief, and humanitarian missions throughout the world. All six aircrafts were delivered by 2014, while two C-17 transporters joined the KAF in 2017, as the Shaykhdom’s humanitarian missions increased in scope and required heavy lifters.

On 12 September 2015, the Eurofighter consortium revealed that the Eurofighter Typhoon was selected by Kuwait to update its fleet with 28 new jets. A year later, it was further announced that the sale of up to 40 new Super Hornets was submitted to the US Congress for approval, in a deal estimated at \$10.1 billion.¹⁸ This recapitalization of the Shaykhdom’s combat-aircraft fleet significantly enhanced its air-combat capabilities although only 66 combat-capable aircrafts were ready in early 2019 manned by the KAF’s 2,500 personnel.¹⁹ In early February 2018, the United States approved the sale to Kuwait of four King Air 350ER Intelligence, Surveillance, and Reconnaissance (ISR) aircraft, which was a first as the KAF sought to establish a dedicated airborne ISR fleet in its ongoing modernization efforts.²⁰

Royal Air Force of Oman

The Royal Air Force of Oman (RAFO) was formed on 1 March 1959 with three Provost jet trainers and two Pioneer transport aircraft that operated from a small runway in Bayt Al-Falaj near Muttrah. In 2019, it fielded modern fighters (F-16s, Hawks) and helicopters, manned by an estimated 5,000 personnel, operating out of seven air bases, with the latest – at Adam – specifically built for the 12 Eurofighter Typhoons.²¹

Royal Air Force planes touched down at various Muscat and Oman facilities when they operated to and from the Gulf region or even made the run to India in the East and several African spots in the South. RAFO, however, had no such capabilities and fielded a modest force in 1968. At the time, four Beaver aircraft joined the fleet, followed by 12 Strikemasters. After 1970, when Qabus bin Sa’id became the Sultan, the air force came into its own as the dynamo of national defense as well as of national civil development, when several additions were made in rapid succession: three Caribous from Canada, six Skyvans from the UK along with eight helicopters, all of which were heavily used in the Dhuffar Rebellion (1963–1976). Five Viscounts joined the fleet in 1971, followed

in February 1975 by the mighty Hawker Hunter attack planes, which played key roles in providing close air support as well as significant operational missions during the civil war. Importantly, the helicopters were used to transport flying medical teams to rural areas where such services were scarce, probably the single most beneficial use of these assets, although they also came in handy for search and rescue operations.

RAFO witnessed quantum leaps in more recent years, as fighters and transports were acquired, though the key emphasis remained on training human resources. Towards that end, the Air Force Technical College (AFTC), one of RAFO's main educational establishments, provided technical and non-technical courses and on-the-job training. Located at Sib Air Base near the capital city, Muscat, the AFTC boasted solid programs to entice young recruits. It was not always that easy. In fact, when the original Trade Training Institute (TTI) was transformed into a military college in 1993, few anticipated the demands on the institution. As the quantity and kind of equipment increased, aircraft engineering in such specialized fields as airframes, engines, armory, and electrical concerns, among other fields of expertise, necessitated qualified personnel, preferably indigenous ones, though the going was tough. Operations activities, supply, air navigation, air movement and various administrative duties added to the AFTC's original woes, as qualified graduates filled available posts. As a result of such expansion, the AFTC revolutionized what was available in Oman, as it went from being a mere training institute to an integrated college offering technical and non-technical professional courses to all RAFO personnel and officers.²²

With more advanced equipment in the fleet, including 63 combat capable F16s, Typhoons, Hawks, Mitsubishi MFI-17B, and Pilatus PC-9s, along with 20 transporters (C-130 Hercules, Casa-295s, Skyvans, and with two Airbus 320 passenger jets), RAFO leaders approved the establishment of the Oman Aircraft Control College, which was previously known as the Air Traffic Control School (ATCS).²³ Early on, RAFO identified specific requirements for specially trained staff members who would become Air Defense System Operators. Inasmuch as training in this college started on advanced simulators to keep pace with the latest aircraft and radar systems being introduced, and to serve the Sultanate's joint civil-military needs, graduates joined a unique cadre of essential staff members. The goal of the college is to serve all GCC States in radar simulation and ATC tower training according to the latest International Civil Aviation Organization and Royal Air Force standards for civilian and military regulations respectively, which bode well for the conservative Arab Gulf monarchies in search for self-sufficiency in this critical domain. Clearly, ensuring flight safety was paramount, especially as the Omani and all of the GCC airspaces became significantly more crowded in recent years.

Qatar Amiri Air Force²⁴

At the time of independence on 3 September 1971, the Qatari armed forces consisted of little more than the Royal Guard Regiment, along with several scattered

units equipped with a few armored cars and four small aircraft. The air force was not formed until 1974, when it fielded fewer than 100 personnel, mostly foreign pilots and technicians. In 2019, the total number of men in uniform stood at less than 16,500, though those serving in the Qatar Amiri Air Force (QAAF) stood at 2,000.

Initially outfitted with British weaponry, Qatar shifted much of its procurement to France starting in the early 1980s for at least three reasons: French efforts to develop closer relations with Doha; the Qatari approval of France's perceived pro-Arab positions on a variety of regional concerns; and the desire to differentiate itself from the preponderant Arab Gulf power, Saudi Arabia. Before 1994, the air force was equipped with combat aircraft and armed helicopters, primarily Alpha Jets with a fighter-ground attack capability and one air defense squadron of Mirage F1s, all purchased from France, based at the Doha International Airport that reserved an area for the military. Even if an increasing number of young Qataris were trained as pilots and technicians, French specialists were then employed in a maintenance capacity, simply because Qatar lacked a sufficiently large indigenous manpower pool from which to draw qualified staff members. Considerable changes were introduced to the QAAF after the mid-1990s, as Doha's defense expenditures grew significantly from US\$500 million in 1989 (8 percent of the gross domestic product) to US\$934 million in 1991 (an 80 percent increase over 1989) and to US\$1.913 billion (about 1.5 percent of the national GDP) in 2010, according to the Stockholm International Peace Research Institute.²⁵

Starting in 2012, Doha embarked on another major expansion of its armed forces and in 2014 announced orders for weapons worth \$23.9 billion dollars. The International Institute for Strategic Studies confirmed that Qatar planned to transform and significantly enlarge its armed forces, as Doha became the 46th largest arms importer in the world in 2014 when it purchased 24 combat helicopters and three AEW aircraft from the United States, and two tanker aircraft from Spain. Clearly, the presence of a large American military base in the country provided Qatar with guarantees for most of its national security needs, though it befell on nationals to defend the homeland. Towards that end, Doha sought to equip and train its men and introduced a modest conscription scheme in 2014 that, over time, was expected to increase training among the indigenous population and perhaps the creation of a military reserve. In fact, significant changes were reported to national-service liabilities in 2018, with sharp increases in terms of service (now up to 18 months) and, in what was a GCC-wide trend, making national service voluntary for women who aspired to join the military.

By 2019, the QAAF's initial Mirages were sold to Spain, as Doha embarked on a full-fledged reequipment spree.²⁶ In the short four years since, a joint Eurofighter Typhoon squadron was planned with London and, it may be safe to state that the Al Thani ruling family intended to dramatically increase the size of the air force. If all of the recent procurements go through, Doha will have a sharp combat capability, even if its dilemma – to construct the necessary infrastructure

and train sophisticated maintenance personnel – would weigh on its progress. Still, in 2019, the QAAF was composed of two fighter wings, for fixed- and rotary-wing equipment. In turn the fixed-wing assets were split into two squadrons, the Number 7 Air Superiority composed of Mirage 2000s, and the Number 11 Close Support composed of the Alpha Jets. Three new squadron would presumably form, one each for the 36 Rafales, 36 F-15Es, and 24 Typhoons. The second wing was devoted to rotary aircraft and was, in turn, divided into three squadrons: the Number 6 Close Support with Eurocopter SA342 Gazelles, the Number 8 with Anti-Surface Vessel Westland Sea King Commando Mk 3s, and the Number 9, a Multi-Role Squadron that includes Sea King Commando Mk 2s and several other helicopters. In addition, there was a dedicated Amiri Flight group, primarily a transport wing, with eight C-17 Globemasters, C-130J-30 Hercules, and several civilian aircrafts used by the ruling family.²⁷

As stated above, and before the most recent crisis within the GCC, the QAAF signed a contract worth €6.3 billion (\$7 billion) for 24 Dassault Rafale fighters in May 2015, which made Qatar the third export customer for the fighter after Egypt and India, although it was not clear whether these new assets would be stationed at the increasingly busy Al-Udayd Air Base – shared with the United States – or whether they will use parts of the old Doha International Airport.²⁸ In mid-2018, Doha formally announced the construction of a new air base, to be named after the current ruler, Tammim bin Hamad Al Thani (TBHAB).²⁹ This was followed in early February 2019 with the news that an additional 12 Rafales were added to the original 24 and that the first Rafale was actually delivered on 6 February 2019.³⁰ With the eventual completion of all these deliveries – F-15s, Typhoons, Rafales – the QAAF stood to have 168 combat planes, along with tankers and numerous helicopters. While these additions were net gains to Qatar as well as the GCC as a whole, it remained to be determined how the small country would absorb all of these assets or whether, and realistically, it would rely on foreign pilots and technicians to fly and service them for years if not decades to come.

Royal Saudi Air Force

The Royal Saudi Air Force (RSAF) was the first line of defense against surprise attacks aimed at Gulf oil installations, and its skilled pilots actually flew thousands of sorties before, during, and after the 1991 War for Kuwait. They also repelled Iranian intrusions during the 1980–1988 Iran–Iraq War, which provided fighters with sorely needed training opportunities that, in hindsight, proved to be critical a few years later. In fact, the RSAF was the most combat-ready and reliable of all GCC forces, even if progress was recorded in the UAE as well. Riyadh fielded a separate air defense force, which became independent in the mid-1980s, and operated fixed and mobile anti-aircraft missile systems that guarded cities, oil facilities, and other strategic sites, chiefly along the coasts. These missile systems, along with the combat aircraft and ground radar stations, were linked to the Peace Shield air defense network, which depended heavily on

surveillance by aircraft of the Saudi-operated and United States supported airborne warning and control system (AWACS).

Saudi Arabia received British assistance to create the RSAF in the mid-1920s, and flew various platforms, including DH9s that were inherited from the fallen Hashimite forces in the Hijaz. Interestingly, the founding monarch, King Abdul Aziz, enjoyed flying on Italian-made Caproni Ca-101s in the early 1930s, long before President Franklin D. Roosevelt made arrangements for the delivery of two DC-3s in 1945. In fact, and between World War II, the nascent RSAF flew Savoia-Marchetti SM-79 bombers, which were purchased from Italy to form the nucleus of the air force that was reorganized in 1950.³¹

Even if Riyadh purchased Italian and British-made jet aircraft before World War II – 20 De Havilland Vampire FB-52 and 40 Lightning supersonic models – it quickly turned to the United States for both advanced aircrafts as well as construction assistance. In time, some USAF aircraft were transferred to the RSAF while the United States Military Training Mission at the Dhahran Air Base qualified Saudi pilots and maintenance personnel on Buckaroo T-6s and Chipmunk T-33As. Washington provided a number of Sabre F-86s too, although Dhahran Airfield operations created difficult problems. Negotiations over the former US base took a toll on both sides before full sovereignty over the base was transferred to Riyadh in 1962.³² Notwithstanding these significant differences, which were eventually resolved to Riyadh's satisfaction, it became apparent that the Kingdom was wedded to western hardware and, consequently, training. Both the UK and the US were and remained involved in training programs conducted in Saudi Arabia, and both provided assistance throughout the 1980s and 1990s. Although the RSAF was rather small by Middle Eastern standards, it displayed effective firepower, derived from advanced technology. Over time, the fighter force introduced 134 Tornados – from which a batch of 48 Tornado IDS were ordered in 1993 under the al-Yamamah II program – and 72 F-15S aircraft delivered from the mid-1990s, which operated beside the more than 120 F-15C/D aircraft delivered starting in 1981.

In 2019, the first line combat air strength of the RSAF consisted of some 407 combat capable aircrafts, organized into four fighter squadrons, eight fighter/ground attack squadrons, two airborne early warning and control squadrons, along with an electronic intelligence squadron as well as eight transport squadrons. The personnel strength of the air force was estimated to be about 20,000.³³ In 2018, the Kingdom's defense budget topped the \$82 billion mark, one of the highest in the world. Yet, and given the size of the country, Riyadh's military procurements were modest and its capabilities, especially in comparison to the air power of neighboring countries, merely adequate. Nevertheless, the RSAF was considered to be the most modern and effective of the Saudi services, and its mission – to defend the economic installations and the widely scattered population centers of Saudi Arabia against attack and, particularly, to repel air attacks or amphibious assaults against the country's highly vulnerable oil pumping stations, processing and loading facilities, and oil platforms in the Arabian Gulf – daunting. In fact, the RSAF was the first line of defense to protect a quarter of

the world's proven petroleum reserves, a duty the Al Saud took very seriously. Towards that end, and before the Tornados and Eagles arrived, the RSAF acquired 114 Northrop F-5 fighters in 1972. These eventually served as advanced jet trainers and all of them were retired in the late 1990s. By 1992, the RSAF had 78 F-15s, including fighter conversion trainers, and in 2019, had a complement of 220 F-15s spread across six squadrons. Of course, purchasing the F-15s was not easy, on account of stiff opposition by Israel that lobbied Washington against the sales. As a result of the early US rebuffs, Riyadh turned to London to meet its full requirements, which resulted in mid-1988 into one of the biggest transactions until that time, when it was announced that the RSAF would acquire Tornado fighters from Britain in their strike and air defense configurations, along Hawk and Pilatus PC-9 trainers built in Switzerland and outfitted in Britain.³⁴ In 2019, Riyadh deployed 79 Tornados, of which 12 served as ISR platforms, along with 71 Typhoons.

In addition to the fighter, ground attack, and air defense squadrons, the RSAF fielded eight transport squadrons, equipped with C-130s in various versions and Beech 350 Kings. Three tanker squadrons, one with seven KE-3As and another with six A330 MRTTs, as well as seven training squadrons (with at least 181 fixed-wing aircrafts), existed too. Four helicopter squadrons employed a variety of smaller rotary-wing equipment, including 65 AS352 Cougars, Bell 212s and 412s as well as Twin Hueys for search and rescue, while Naval Aviation fielded 46 helicopters.

Because ground-based radar could not provide adequate advanced warning of attacks on sensitive targets along the Gulf, particularly from nearby Iranian air bases, Saudi Arabia ordered five E-3A AWACS aircraft in 1981, which were supplemented with two Saab 2000 Erieye platforms in the airborne early warning squadron. To allay Israel's concerns, the aircraft were equipped specifically for the defensive needs of the Arabian Gulf and Red Sea areas although recent upgrades enhanced their capabilities.³⁵ The first aircraft reached operational status in 1987 in time to assist US naval operations in the tanker war in the Gulf. Congress required that Washington have substantial control over the use of the airplanes and a sharing of the AWACS data, which was done, though most of these fears proved to be pedantic. In fact, ties between the RSAF and USAF grew so closely that, by 1985, the Kingdom contracted with a consortium headed by Boeing for the Peace Shield command, control, communications, and intelligence (C3I) system. Its purpose was to link information collected by AWACS and ground-based surveillance radar with fighters and ground air defense, including the I-Hawk SAMs, to provide integrated air defense against attacks across the Gulf and Red Sea and from the direction of Yemen. Hughes Aircraft Corporation assumed management of the project after 1991, which took several more years to complete, though the system was fully operational by early 1996. To be sure, the huge Al Yamamah contract was controversial because of alleged bribes associated with its award, but the RSAF announced its intention to purchase the Typhoon platform from the British Aerospace Corporation in December 2005, which confirmed Riyadh's decision to diversify its purchases

despite various controversies. A memorandum of Understanding was signed on 18 August 2006 for an initial batch of 72 aircraft in a £6–10 billion deal, which pleased the British Government, even if it also raised serious questions.³⁶

The United States was not left out in the cold. On 29 December 2011, Washington signed a \$29.4 billion deal to sell 84 new F-15s in the SA (Saudi Advanced) configuration, which also included upgrades for the older F-15s up to the SA standard, along with related equipment and services.³⁷ A year later, BAE Systems sold 22 advanced Hawk jet trainers to the RSAF for a total of £1.9 billion (\$3 billion), which further beefed the force's capabilities.³⁸ These deals illustrated how the Kingdom intended to protect and enhance its air force assets, maintaining a balance between its British and American allies for training and equipment. It even contemplated the acquisition of security services to protect the RSAF from Cyberwarfare.³⁹

As stated above, Saudi Arabia maintained a separate Air Defence Forces (ADF) with 16,000 servicemen, divided into six battalions with MIM-104D/F Patriot PAC-2 GEM/PAC-3 17 batteries, Shahine/AMX-30SA 16 batteries, and MIM-23B I-Hawk 73 units (static defense). In 2019, the ADF surface to air missiles included long-range 108 MIM-104D/F Patriot PAC-2 GEM/PAC-3 Medium-range, 128 MIM-23B I-Hawk Short-range SAMs, and 181 Crotales (40); Shahines (73); and Crotale/Shahines (68). A Strategic Missile Forces unit existed too, with 2,500 personnel that fielded 10+ DF-3 (CH-SS-2) tactical IRBM/MRBM along an undetermined number of DF-21s (CH-SS-5).⁴⁰

The United Arab Emirates Air Force

The military history of the United Arab Emirates began with the Trucial Oman Levies, created in 1951 in Sharjah to fight Saudi forces in the Buraymi Oasis, but which were renamed the Trucial Oman Scouts (TOS) in 1956. At the time, the force stood at about 160 British officers and soldiers and, by 1960, had 1,000 paramilitary personnel.⁴¹ The TOS was turned over to the UAE as its defense forces in 1971 and consisted of about 2,500 regular military personnel but grew to 3,250 regulars by 1975, organized into six Mobile Squadrons and an Air Detachment with seven helicopters.

Although initially small, the UAE armed forces have grown significantly over the years and are presently equipped with some of the most modern weapon systems available anywhere, purchased from a variety of sources, including France, the US, and the UK. In 2019, most UAE troops were Emiratis, along with a few citizens from other Arab countries, though Moroccan and Pakistani pilots were on secondment in the 1970s and 1980s. Today, almost all of the officers are nationals even if a number were naturalized to qualify for key posts.

The United Arab Emirates Air Force (UAEAF) was established in 1972 and stood as the crown jewel of the country's military institutions with an impressive fleet of nearly 600 planes, including six fighter/ground attack squadrons equipped with 156 combat capable aircrafts (78 F-16Es and Fs, 59 Mirage 2000–9DAD/EADs, while 7 Mirage 2000 RADs served ISR duties), as well as a

small squadron of three Airbus A330 MRTT air-tankers. Several trainers, including Hawks, were available for combat as well. In 2019, the UAEAF fielded around 4,500 personnel, though an increase in the numbers was likely as soon as new platforms were introduced, while Abu Dhabi boasted C-17As, C130s, and scores of training equipment as well as dozens of helicopters.⁴² A separate Air Defense branch functioned with three battalions of MIM-23B I-Hawk; MIM-104F Patriot PAC-3, as well as Crotale, Mistral, Rapier, RB-70, Javelin, 9K38 Igla (SA-18 Grouse), and 96K6 Pantsir-S1 short-range air defense missiles. In 2016, the UAE received 12 US-manufactured THAAD ballistic-missile-defense batteries.

The air force's predecessor, the Abu Dhabi Army Air Force unit was formed in 1968 under British rule, though it evolved quickly after independence. Initial training and instruction was provided by the Pakistan Air Force, as Abu Dhabi and Islamabad shared very close security ties, though the UAEAF faced considerable integration problems after the Dubai AF, which maintained its own air component – then formally known as the Dubai Defense Force Air Wing – merged with it in 1999. Since 2019, the UAEAF has been divided into two operational commands, the Western Air Command in Abu Dhabi and the Central Air Command in Dubai. Notwithstanding integration problems that lingered, the ambitious modernization of the UAEAF allowed the country to attain a level of capability that matched the highest NATO standards, which permitted it to join the Egyptian Air Force in 2014 to carry out airstrikes in Libya against Islamist factions.⁴³ It was, of course, impossible to know whether Abu Dhabi acted without informing its Western allies, something that would have been uncharacteristic under the worst of circumstances, although the UAEAF joined in US-led air strikes against terrorist targets in Syria and Iraq in September 2014, during *Operation Inherent Resolve*. These operations were suspended after militants in the so-called Islamic State (IS) captured, tortured, and executed a Jordanian pilot in late December 2014, although informal cooperation continued pending improvements in US search and rescue capabilities in the region. Interestingly, Major Mariam Al Mansouri, reported to be the first female UAEAF pilot, “led the squadron” of UAE F-16 fighter jets on one of the first attacks on IS targets, which leveled 12 small modular oil refineries, used to fund IS operations, finance its activities, and fuel its vehicles.⁴⁴

Over the span of less than four decades, the UAEAF made gains as indigenous pilots replaced Moroccans and Pakistanis who could fly the first Mirages that joined the fleet.⁴⁵ In 2019, former Pakistan Air Force officers and technicians were still active on duty, though a new generation of Emiratis flocked to join the prestigious force, training on Grob G115s, Pilatus PC-7s, and Hawk 63s. There were also Aermacchi MB-339s from the previous Dubai Wing for training purposes. With the introduction of more sophisticated aircraft, Canadians, Jordanians, South Africans, and Americans joined the Pakistanis and Moroccans to train UAE pilots at the Al-Ain Air Academy. Instructors at Al-Dhafrah Air Base were chiefly drawn from the US, as the UAEAF retired its Mirage IIIs in favor of F-16 Falcons. In addition to Al-Dhafrah, there were four other operational air

bases, split between the Western and Central Air commands. A \$1 billion new facility was recently completed deep in the Abu Dhabi desert, near the border corner with Saudi Arabia and Oman, boasting a 3,000m long runway and aircraft parking nearly the same size as in Al-Udayd Air Base in Qatar. Al-Safran Air Base, which was built around 2008, stood as a key facility both for the UAE as well as the GCC for any foreseeable contingencies.⁴⁶ Moreover, it was important to mention that the UAE's Special Operations Command had its own airbase, and operated a wide range of helicopters, including 37 combat capable fixed-wing aircrafts (King Air, Cessna, Twin Otter, Caravan, and Air Tractor), 28 Apaches, and several dozen transporters.⁴⁷

In the aftermath of recent conflicts, the UAE requested proposals from Boeing, Dassault, and Eurofighter for a next generation fighter, and announced that it required a more advanced aircraft than the current Rafale in service with the French Air Force. While a decision awaited to see whether Abu Dhabi might acquire the Lockheed Martin F-35A, 25 additional F-16s were ordered in 2013, though several other platforms were also under consideration.⁴⁸

Contemporary airpower doctrine

For political reasons, GCC States have struggled with military cooperation and integration ever since 1981, which meant that the alliance has failed to make anticipated strides. Naturally, the six countries' military institutions recorded steady progress, but as the crisis with Qatar illustrated after 2017, non-military considerations weighed in the decision-making process that weakened the alliance, even if full-fledged union was inevitable.⁴⁹ Confronted by serious trust issues, GCC rulers preferred to embark on bilateral ties with leading global powers, as Kuwait embraced the American cocoon, Doha conducted high-profile joint exercises with US and UK forces, while Oman held similar maneuvers with the UK. Manama, Abu Dhabi, and Riyadh forged ahead, put up a unified front, and paid the price, especially in the War for Yemen, even if the formation of a military coalition to fight Huthi rebels – that included several countries and, lest we forget, received full Western backing – served GCC interests.⁵⁰ All six member-states routinely purchased for non-compatible platforms, Typhoons from London, F-15s from Washington, Rafales from France – to mention just these three systems – while joint missions and procurements suffered accordingly.

Still, GCC States relied on air power to help preserve and strengthen their security requirements and, in peacetime, extended vital airlifts to alleviate human suffering whenever national disasters occurred throughout the region and beyond. All six GCC governments perceived their air forces as ideal instruments to manage various crises and, during wars, relied on them to provide timely observations of the adversary before military operations were launched; helped destroy enemy assets; allowed them to reach deep targets to coerce opponents; denied foes the ability to employ air and surface and sub-surface forces effectively; and, finally, diverted adversaries to destroy and demoralize them.

These were the fundamentals of the GCC airpower doctrine although Riyadh and Abu Dhabi – and to lesser degrees Muscat, Manama, and Kuwait City – made the necessary commitments to preserve the alliance. It was, consequently, fair to ask whether the ongoing ideological dispute with Doha affected the alliance's long-term viability – even if concerns went beyond military questions. One was tempted to conclude that the GCC was a spent force, unable to put its internal house in order, and riding gargantuan egos displayed by leaders unwilling to compromise.⁵¹ This, to say the least, was probably a far too pessimistic appraisal as time was bound to heal current woes. Indeed, it may well be argued that GCC countries had no choice but to join hands to effectively defend their realms, even if they relied on their allies over the short-term. In the end, it was critical for Saudi Arabia – in its capacity as the largest and most powerful member-state – to salvage the GCC and transform the alliance into an effective union precisely to defend the conservative monarchies from regional foes.

Future issues, challenges, and responses involving airpower

Notwithstanding sociopolitical shortcomings, there were several problems facing GCC militaries in general and air forces in particular, which failed to anticipate future concerns, challenges, and responses. In fact, the chief problems that confronted the alliance involved the ability to absorb advanced technologies, introduce managerial and administrative skill levels that such platforms required, gain combat readiness and operational training capabilities, and coordinate between forces. These were daunting challenges to any service anywhere but they were made urgent for GCC countries that faced critical manpower shortages because of small population sizes, relatively difficult recruitment standards, and limited educational levels. Equally critical were the burdens of bureaucratization, which were high, and that reduced military effectiveness. Unlike other services, air force needs were complex, and flew along the prestige coattails that sharply enhanced a country's moral image of the military.

One of biggest obstacles involved logistics and aircraft maintenance, as leading powers like Saudi Arabia depended on foreign contractor support and depot maintenance to run the Kingdom's large arsenal of highly sophisticated aircraft. There is no doubt that Saudis have amply demonstrated intrinsic capabilities in ground crew operations, though they still required assistance to maintain high readiness levels over long periods of time. This was a recurrent problem with the other GCC states too. GCC air force officers were likewise challenged by limited strategic intelligence, surveillance, and reconnaissance (ISR) capabilities, which were amply demonstrated in the ongoing War for Yemen. Detailed ISR capabilities are "critical when targets shift from large stationary marks to fleeting battlefield ones, such as when searching for vehicles, enemy fighting positions or even single fighters escaping on foot," to cite just this one example.⁵² What GCC States lacked were manned and unmanned systems and, of course, satellites to remedy ISR shortcomings. Of course, all six

member-states were in the process of acquiring various ISR capabilities, even if several years are required to gain the necessary expertise to manage these systems effectively.

Finally, though Saudi Arabia and the United Arab Emirates acquired aerial refueling capabilities, these were limited to 16 (seven KE-3As and six A330 MRTT for the Kingdom, and three A330 MRTT air-tankers for the UAE) units. Kuwait possessed limited capabilities in this area and Qatar was equally interested in beefing its modest holdings but the process was painstakingly long and arduous. Given vast distances and immense duties, many more aerial refueling tankers were needed and, as best illustrated in the Yemen or Syria campaigns against the Huthis and IS, the reason why American tankers were required for long-range deep strike missions. The process was even more complex with respect to very limited unmanned aircraft capabilities even if all six GCC member-states sought to purchase such equipment from a variety of sources including China. As Riyadh further experienced, ballistic and cruise missiles were deployed on and around the Arabian Peninsula, which posed very serious threats and that, if only for necessity, required sharp offensive and defensive responses.

It was vitally important for all GCC air forces to have specific missions to defend the alliance and towards that end, training that involved the knowledge of a foreign language, along with some science and math aptitudes, became obligatory to a large and growing force that shouldered immense responsibilities. Air force personnel required quality education and while some of this training was or could be acquired on-the-job, much of it was of the long-term variety that necessitated solid K-12 and university systems in place. Short of such attention, GCC air forces were bound to take more time to reach required levels of expertise, especially with respect to maintenance positions that could not, or ought not, be delegated to allied troops. Inasmuch as inevitable coordination between services with clear Rules of Engagement (ROE), command, control, and communication (C3), electronic warfare (EW), tactics, night and for all weather operations were required across the GCC, it behooved military officials to invest in their personnel at early stages, in toto and across the six member-states. One of the chief challenges that GCC militaries confronted in the past was the limited ability to coordinate on so many levels, which only promised to grow in complexity as more sophisticated systems came on board, and that truly stood as harbingers of future capabilities. Pessimists dreaded those options though the legacy, and record, of GCC air forces during the past few decades highlighted that genuine progress was indeed possible.

Notes

- 1 Views and opinions contained herein are the author's own and should not be attributed to any officials affiliated with the King Faisal Center for Research and Islamic Studies, any Saudi Arabian national, or the Government of Saudi Arabia. The author is solely responsible for any errors that remain in the document.
- 2 Yergin, 1991.
- 3 Khlebnikov, 2015, pp. 17–27.

- 4 Gaub, 2016.
- 5 Kramer, 1996, pp. 161–187 (in a chapter aptly titled “Khomeini’s Messengers in Mecca” [the quotation is on page 174]).
- 6 Khomeini, 1989.
- 7 Gfoeller, 2008. See also Black, 2010.
- 8 Segall, 2014.
- 9 Moghul, 2015.
- 10 Karagül, 2017.
- 11 This and the following five sections, for each GCC member-state, draws upon and updates data first published in Kéchichian, 2016.
- 12 International Institute for Strategic Studies, 2019, pp. 334–336.
- 13 First UH-60M Delivered to Bahrain, 2009.
- 14 Kelly, 2018.
- 15 Schofield, 1991.
- 16 Mobley, 2001.
- 17 Wise, 2007, and Knights, 2006.
- 18 Capaccio, 2016.
- 19 International Institute for Strategic Studies, 2019, pp. 351–353.
- 20 Kuwait Orders King Air 350 Spyplanes, 2018.
- 21 RAFO operated from seven air bases, most notably Sib (SAB) and Thumrayt (TAB) for the fighters, along with Adam for the Typhoons, while Khasab, Musannah, and Salalah housed various helicopters, including the modern NH-90s. Masirah is more or less exclusively used for training, although it receives other aircraft on a periodical basis and, more important, welcomes foreign air forces that prefer to keep low-key footprints that fly over the nearby Straits of Hormuz. Various reports confirmed that TAB participated in the USAF’s first air expeditionary wing force deployment even before the War for Iraq, serving as the host for the 305th Air Expeditionary Wing. A 2002 press report mentioned the presence of the “406th Air Expeditionary Wing” at TAB, equipped with air refueling aircraft, although most of these activities were highly classified and seldom discussed in open fora. See Eielson Guard Unit Returns Home from Desert of Oman, 2002. See also BBC News, 2012b; Oman Completes Typhoon Deliveries, 2019, and International Institute for Strategic Studies, 2019, pp. 360–362.
- 22 Oman Air Force Technical College, 2019.
- 23 Kéchichian, 2016, pp. 96–98. See also Eurofighter Typhoon, 2017.
- 24 The section on the Qatari Air Force is included in this chapter because the current crisis with Saudi Arabia, Bahrain, and the United Arab Emirates is not the type that will last forever, even if few are currently disposed to negotiate a way out. Importantly, and despite a two-year-long break in ties, the most recent GCC Peninsula Shield exercises kicked off in Dammam, Saudi Arabia in late February 2019, *with* the participation of Qatari forces. The two-week-long exercises aimed to enhance joint cooperation and exchange of expertise among the GCC forces, presumably to raise the level of training for all the joint armed forces. Press reports highlighted training at command centers, along with field instructions with live ammunition, all of which occurred during the early 2019 maneuvers. See Joint Peninsula Shield Drills Begin with Qatari Participation, 2019. See also Qatari Force Arrives in Saudi Arabia to Take Part in the Al Jazeera Shield Drill, 2019.
- 25 Perlo-Freeman et al., 2015, p. 5.
- 26 International Institute for Strategic Studies, 2019, pp. 363–365.
- 27 Boeing, 2015.
- 28 Irish and Altmeyer, 2015.
- 29 Binnie, 2018.
- 30 Qatar Receives First Rafale Jet, 2019, p. 1. In September 2016, the sale of up to 72 F-15QAs to Qatar was submitted to the US Congress for approval in a deal valued at US\$21.1 billion, and that was signed in November 2016. As stated, the QAAF also

- ordered 24 Typhoon fighter jets from the UK in September 2017, along with the 36 Rafales. See Capaccio, 2016. Earlier, Doha had selected two tanker/transport based on the Airbus 330 platform; see Airbus, 2014.
- 31 Stuart-Paul, 2001. This heavily illustrated volume includes photographs of all the aircraft models flown by the RSAF.
 - 32 Hart, 1998, pp. 82–111.
 - 33 International Institute for Strategic Studies, 2019, pp. 365–368.
 - 34 Cooper, 1997, pp. 131–156.
 - 35 Laham, 2002. See also Weisgerber, 2013, and Stevenson, 2014.
 - 36 Saudi Arabia Orders Eurofighter Typhoons in up to 10 bln stg Package – Report, 2005.
 - 37 Wolf, 2011.
 - 38 BBC News, 2012a.
 - 39 Reed, 2013.
 - 40 International Institute for Strategic Studies, 2019, p. 367.
 - 41 Curtis and Cawston, 2010.
 - 42 International Institute for Strategic Studies, 2019, pp. 372–375.
 - 43 Kirkpatrick and Schmitt, 2014; see also BBC News, 2014.
 - 44 Harris et al., 2014. See also Saul, 2014.
 - 45 Almezaini, 2014, p. 103.
 - 46 Osborne, 2015.
 - 47 International Institute for Strategic Studies, 2019, p. 374.
 - 48 Shalal-Esa and MacLean, 2013.
 - 49 Kéchichian, 2016, pp. 250–265.
 - 50 The Security Council of the United Nations, acting under Chapter VII of the UN Charter, passed Resolution 2216 in 2015, which expanded the sanctions regime through the creation of a targeted arms embargo against the Huthis and *authorized* states to
 take the necessary measures to prevent the direct or indirect supply, sale or transfer to, or for the benefit of Ali Abdullah Saleh, Abdullah Yahya Al Hakim, Abd Al-Khaliq Al-Huthi, and the individuals and entities designated by the Committee established pursuant to paragraph 19 of resolution 2140 (2014).
- See United Nations Security Council, Resolution 2216, 2015. The anti-Huthi coalition was initially composed of Bahrain, Egypt, Jordan, Kuwait, Morocco, Qatar, Saudi Arabia, Sudan, United Arab Emirates, while the United States and the United Kingdom deployed military personnel in the command and control center responsible for Saudi-led air strikes on Yemen, having access to lists of targets. Qatar was suspended from the coalition after the 2017 crisis and Morocco ended its participation in 2019, due to deteriorating ties with Riyadh following a television program on Al Arabiya that questioned Moroccan sovereignty over the Western Sahara. See BBC News, 2018.
- 51 Kabalan, 2018.
 - 52 Stratfor, 2014.

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15 The Red Sea and the Gulf of Aden

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The Gulf of Aden and Bab al-Mandeb, the waterways connecting the Arabian and Red Seas, are the gateway to the Suez Canal and one of the most lucrative and strategically vital naval routes in the world. This crossing is surrounded on both sides by two regions synonymous with internal unrest and regional conflicts. Yemen and Somalia share many of the same challenges in modern state formation and national unity. Contemporary terrorist insurgencies like al-Qaeda of the Arabian Peninsula and al-Shabaab have seized outsized media attention over the past decades for brazen attacks and associations with other international organizations. This has obscured the extent to which the economies, societies, migrations, illicit trade, and criminality have traversed the straits and connected the Horn of Africa with South Arabia.

This vital waterway, connecting Asia and Europe and leading directly into the Suez Canal, hosts 33,000 ships per year, including 6,500 tankers which constitute an estimated 7 percent of the world's daily oil supply.¹ Regional and international powers continue to maintain a heavy international presence in the waterways surrounding Bab al-Mandeb, and are partially responsible for the self-fulfilling prophecy of instability in Yemen and Somalia. Neither country has had the capability of overcoming global machinations to capitalize on the lucrative transit point for so much of the world's commerce and oil. The ensuing arena of competing powers and interests has undermined the central governments of both countries leading to a worrisome fragmentation and to an ongoing armed conflict and refugee crisis that threaten to undermine the global economy.

Overthrowing a monarchy and establishing a republic

The northern mountains of Yemen have long been considered one of the most inhospitable terrains on Earth, rivaling the Khyber Pass in Afghanistan for its ability to resist the conquest of regional and global empires from ancient times to the modern era. Roman, Portuguese, Ottoman, British, Egyptian, and Saudi armies have been held at bay by rocky mountains, an extensive and interconnected cave network, and the famed tenacity and marksmanship of tribal militias. Foreign armies were confined to the western coastal regions of Tihama

and the plains south of the capital city of Sana'a. The same mountains that struck fear into the hearts of colonialists were also those that produced the picturesque terraced gardens and an agricultural economy lucrative enough to sustain a self-sufficient and traditional tribal society. For nearly 1,000 years, Yemen's northern tribal areas were ruled over by an imam, or religious leader, who adhered to the doctrinal principals of Zaydi Islam, a sect of the Shi'i branch of Islam. While no foreign power succeeded in conquering the imam's territory, Yemen's last imam was overthrown by an internal military coup during the 1960s, dragging the country into a bloody and costly civil war that forever transformed its political and social hierarchy.

On September 26, 1962, a young Yemeni army officer named Abdullah Sallal orchestrated an artillery assault on the imam's palace in Sana'a, prematurely declaring his death and the establishment of the Yemen Arab Republic (YAR). Imam Muhammad al-Badr had escaped his palace under siege and several weeks later crossed the border into Saudi territory, seeking refuge and financial assistance from the Saudi monarchy. Sallal, on the other hand, reached out to Egypt and secured a military commitment to support the nascent republic. Over the next eight years, tribal militias allied with the deposed imam and financed by Saudi Arabia fought a civil war against republican forces supported by upwards of 70,000 Egyptian troops and one-third of the Egyptian air force. In characteristic fashion, the northern highlands of Yemen acted as an insurmountable barrier to Egypt's mechanized army, resulting in a territorial stalemate where the republic was limited to the major urban areas while Imam al-Badr controlled the rural regions to the north and east of Sana'a. International interest in the civil war dissipated in 1967 as the June 1967 Arab-Israeli war shifted the world's attention and warranted a complete Egyptian withdrawal from Yemen. Although sporadic fighting continued following the end of the historic siege of Sana'a in February 1968, the war was essentially over with republican forces emerging victorious. Imam al-Badr's abdication and exile in 1970 paved the way for a tenuous compromise between political rivals and a republican regime that remained in power until 2015.²

The Yemeni constitutional conference between the former imam's supporters and the YAR Prime Minister's office was hosted by Saudi Arabia in the port city of Jeddah in March 1970, marking a new era of Saudi dominance in South Arabia that continues to this day. The emerging constitution and bill of rights implemented effective barriers to the autocracy of the imamate years, while declaring Yemen to be an Islamic nation, adhering to the principles of *sharia*, or Islamic law. These doctrinal tenets favored a cadre of religious conservatives and traditional tribal leaders to the exclusion of left-wing political figures, some of whom fled to South Yemen.³

Abdullah Sallal was replaced as president by Abdul Rahman al-Iryani, a *qadi*, or religious judge, from a respected tribal family, who was the only civilian to serve as North Yemen president. Iryani's presidency oversaw a period of national reconciliation after the civil war and a new era of YAR foreign relations, particularly in drawing closer to South Yemen and setting up the early

foundations for a unified Yemen. The ability to act as a bridge between two generations of Yemenis, between revolutionaries and traditional tribal society, and between the civilian and military authorities, was essential in preparing the country for a decade of coups and the expanded presence of the military in government. This new era began in 1974 when Iryani was deposed by Ibrahim al-Hamdi, a Lieutenant Colonel in the Yemeni army, whose gifted orations and mastery of mass politics rekindled a local sense of Yemeni identity and a resurgence of Arab Nationalism. Hamdi was assassinated in 1977 by tribal opposition who saw his support of republican nationalism as a threat to their longstanding political influence.⁴ His successor Ahmad al-Ghashmi was killed eight months later, leading to the ascendancy of Ali Abdullah Saleh, a young colonel who was scarcely expected to survive the year. Saleh not only survived 1978, but continued on as president for 33 years overseeing a roller coaster of Yemeni politics that included unification, division, war, corruption, and collapse. No single individual so completely represents Yemen as Ali Abdullah Saleh.

The emergence of an Arab communist state

When the British Empire was forced to retreat from the Suez Canal in 1956, it consolidated its Middle East colonial administration in the South Arabian port city of Aden. In the century since Aden was seized by the British navy in 1839, the Empire's only official colony in the Middle East was transformed from a small fishing village into the largest natural harbors outside of New York City. In the surrounding hinterland of South Yemen, tribal territories were folded into East and West Aden Protectorates, coming under the aegis and protection of British Aden. With an eye towards independence, British colonial officials crafted plans for a Federation of South Arabia to govern this corner of South Arabia while Aden remained a British port city. The anticolonial forces of Arab Nationalism that drove the British Empire from Egypt also followed them to Aden. During the 1960s, British colonial authorities in Aden were confronted by Yemeni nationalist groups such as the National Liberation Front (NLF), a Marxist paramilitary organization.⁵ British authorities eventually succumbed to the military and public pressures of South Yemen's war for independence and withdrew from Aden, leaving the country in the hands of the NLF.

The NLF was succeeded by the Yemen Socialist Party, which borrowed a Marxist political model in creating the People's Democratic Republic of Yemen, or PDRY, in 1970. As the first and only Arab communist state, the PDRY formed an alliance with the Soviet Union and gradually severed any remaining economic or political relations with the UK. As a result of the post-1967 closure of the Suez Canal and the withdrawal of mercantile activity from the Red Sea region, Aden no longer figured prominently in global maritime trade, and the country fell into poverty with no alternative economic sectors available to replace the lost commercial activity.⁶ Nevertheless, the USSR financed the PDRY's ambitious social welfare campaign in exchange for access to the strategically vital port of Aden, overlooking the entrance to the Red Sea.

PDRY foreign policy further aggravated tensions with Western Europe and the US, as South Yemen officially supported Marxist revolutions on the Horn of Africa and opened its borders to members of notorious international terrorist organizations. The port of Aden had become the meeting place and training grounds for terrorist groups including the Palestine Liberation Organization, the Popular Front for the Liberation of Palestine, and the Baader-Meinhof Gang – a far-left West German militant organization.⁷ Relegated to the status of a pariah state and with few alternative allies to fall back on, the PDRY grew increasingly reliant upon Soviet aid, a fact that would be particularly detrimental when Soviet foreign policy and aid programs collapsed during the late 1980s.

Internal political tension in the PDRY reached a crescendo in 1986 when the country descended into a bloody civil war between two factions of the Yemen Socialist Party ruling elite. Ali Salem al-Beidh, an early member of the NLF struggle against the British Empire, was one of the only southern politicians to emerge from violence either not killed or not forced into exile. Al-Beidh saw the writing on the wall as the PDRY experienced a precipitous drop in Soviet aid following the 1986 civil war, while at the same time discovering possible oil reserves near the territorial border with North Yemen. A reconciliation with the YAR and the unification of North and South Yemen would help avoid border tensions over access to resources and bring in the financing and economic activity necessary to sustain the PDRY social program and launch a more substantial oil exploration program with the assistance of previously reluctant Western companies. It is with this background that al-Beidh entered into negotiations with Ali Abdullah Saleh in the months leading up to the 1990 unification.

Yemeni unification and the first Gulf War – 1990–91

As South Arabia entered the last decade of the twentieth century, the region was still divided into a North and South Yemen. In the north, the Yemen Arab Republic (YAR) led by Ali Abdullah Saleh received the majority of its foreign assistance from Western capitalist countries. Although it was the more populous of the two Yemens, the YAR suffered from a dearth of social and economic infrastructure and a political class more interested in nepotism and self-preservation than planning and investment.

The end of the Cold War and the impending dissolution of the Soviet Union severely challenged the South Yemeni state of the People's Democratic Republic of Yemen (PDRY). Founded in 1968 as the first and only Arab Communist state, the PDRY was no socialist utopia. Its generous social program and relatively educated population were plagued by political strife among its leadership which pitted radical Marxists against moderates and those with pro-China inclinations against those who preferred a closer relationship with the Soviet Union. Driven as well by the discovery of oil along the North-South border, the two Yemens officially united on May 22, 1990. In a unification agreement crafted by Northern President Ali Abdullah Saleh, political power was to be

shared equally between northern and southern politicians, despite a significantly smaller population in the south.

The newly united Republic of Yemen (ROY) had the misfortune of receiving the privilege to sit on the Security Council as a representative of the Arab World immediately after unification. Faced with a need to make an expedient decision whether to support the US-led condemnation of Iraq or pursue an alternate policy, Saleh was influenced by the overwhelming anti-American sentiments that emerged in Yemen following the Iraqi invasion of Kuwait in August 1990. Large public demonstrations in front of US and Saudi Embassies in Yemen and across the Arab world propagated the slogan: *Ba'd al-yam ma 'ad amrika*, or "After today no more America." The reported arrival of two Iraqi oil tankers to the port of Aden further convinced Saleh that supporting Iraq may indeed produce financial gain for the newly united Yemeni state.⁸

In the aftermath of Yemen's decision to support Iraqi President Saddam Hussein, Saudi Arabia expelled 800,000 Yemeni workers and future foreign assistance was cut by the US and Gulf countries. Aid totaling \$20 million from the US and \$140 million from the World Bank was withdrawn, leaving the united Yemen with fewer resources to deal with a massive influx of unemployed men returning from employment abroad, which had overnight increased the labor pool by 20 percent. The loss of worker remittances, a main economic resource for both North and South Yemen, was accompanied by an urban explosion, housing crisis, and mass unemployment that led to a severe social and political crisis.⁹

Disunited – a civil war in Yemen (1994)

The centralization of northern authority in Sana'a and the poor performance of the Yemen Socialist Party (YSP) in the 1993 elections, fueled a secessionist movement led by 'Ali Salim al-Beidh, who remains one of the most influential southern leaders. The Democratic Republic of Yemen was declared in 1994, but received little international backing, aside from Saudi Arabia, whose monarchy was content with perpetual Yemeni division and weakness south of their border. Among southerners, the YSP received near unanimous support, a testament of local loyalty to a political party seen as the true representative of South Yemen. Cross border fighting between Saleh and al-Beidh was highlighted by the indiscriminate use of ballistic missiles against Sana'a and other northern strategic sites and Saleh's decision to employ the *mujahideen*, or religious warriors, returning from Afghanistan, in the battle against the southern port city of Aden. After the mujahideen sacked Aden, al-Beidh fled the country, leaving behind only those southern leaders willing to ally with Saleh. Among this group was Abd Rabo Mansur Hadi, who Saleh named as Vice President and who would become the interim president in 2011. In the years that followed, northerners were accused of colonizing the south as thousands of carpetbaggers arrived to enrich themselves through political corruption and economic manipulation at the expense of the smaller southern population.¹⁰

Southern defeat in the 1994 civil war did not end hopes for secession or plans to eventually secure autonomy for the south. Post-1994 northern economic and political dominance did little to engender the goodwill of Yemenis living in the south. Anti-northern grievances took shape in the formation of a Southern Movement in 2007, founded on a platform demanding greater control over local natural resources, political equality with the northern countrymen, and increased employment. The failure of Ali Abdullah Saleh to address southern concerns led to the increased militancy of the southern movement and to its emergence as one of the most potent opposition groups in Yemen. Known as *al-Haraka al-Salmiyya lil-Jumub*, or the “Peace Movement of the South,” this leaderless group of disgruntled southerners remained susceptible to al-Qaeda groups promising international financing and local governance.¹¹

The Southern Movement, which became known popularly as *al-Hirak*, began with daily protests in Aden in 2007 demanding equal rights for southerners, the restoration of lost employment given instead to northerners, and retirement benefits for a generation of military officers nearing the ends of their careers.¹² In 2017 elements of the original movement emerged as a potent fighting and political force known as the Southern Transitional Council and continue to challenge foreign rule in South Yemen.

The Houthi wars (2004–10)

The Houthi movement began as a religious revivalist effort for the country’s Zaydi sect of Islam, located predominantly in Yemen’s northern regions. Zaydi Islam, a prominent part of Yemeni cultural and religious history, had been challenged in recent decades by well-financed Saudi religious proselytization in Yemen that propagated a more conservative Salafi brand of Islam. During the 1990s, the religious opposition formed its own political party which embodied the decades-long economic and political grievances emanating from an institutionalized marginalization of the northern tribal population. Badr al-Din al-Houthi, a well-respected religious cleric based out of the northern city of Saadah, along with his family, emerged as central figures in this popular movement.¹³

Badr al-Din’s son, Hussein al-Houthi, officially adopted the slogan “Death to America, Death to Israel, A Curse Upon the Jews, Victory to Islam!” in the early 2000s, mobilizing anti-imperialist sentiments in Yemen and across the Middle East region. The slogan spread like wildfire through Yemen’s northern regions, appearing as printed banners and as chants during mass rallies, conspicuously associating with similar chants spoken by Iranian revolutionaries two decades earlier.

Hussein al-Houthi used his growing popularity to challenge Saleh’s government and demand an end to decades of economic and political marginalization that targeted Yemen’s northern tribesmen. A social revolution was transformed into an armed conflict in 2004 when Yemen’s military forces, under the command of Ali Muhsin al-Ahmar, a well-known Islamist, began the first of six Sa’dah wars with the Houthi tribesmen. Hussein was killed in 2004, posthumously lending

his family name, al-Houthi, to the movement and becoming a martyr for a Zaydi population that constitutes at least one-third of the country's population. Hussein's younger half-brother, Abdul Malik al-Houthi, inherited the movement's leadership, guiding adherents through six years of guerilla warfare before culminating in a seizure of power in 2015.

Yemen's northern highlands where the great majority of the Houthi supporters can be found are one of the most heavily armed regions of the world. Typical tribal males in this area possess an average of three to four weapons each. While most are smaller firearms like handguns, rifles, and machine guns, there are also large numbers of rocket-propelled grenade launchers and even heavy artillery.¹⁴ Heavily armed tribesmen were able to take advantage of the political void following the 2011 Arab Spring protests and the resignation of Saleh to conquer nearly the entire northern half of the country before seizing the capital city of Sana'a in 2014. Houthi forces were supplemented by segments of the Yemeni military who allied with the Houthis and who were trained in the use of the Scud-class ballistic missiles obtained from North Korea in 2002 and other heavy weaponry provided by the US in support of Saleh's counterterrorism programs.¹⁵ Since 2015, the Houthi leadership has transitioned from an organized military force to a state-level actor with the capabilities to tax, print money, and administer government services.¹⁶

In response to the Houthi wars in 2004, Saudi Arabia began to modify its laissez faire policy towards the country's southern border with Yemen. The permeable border between the two countries has become a serious security concerns for Saudis as it has attracted migrants and refugees from Somalia, Eritrea, Sudan, and Ethiopia who travel through Yemeni territory to reach the Saudi oil fields and seek undocumented employment. While this was previously a source of cheap and exploitable labor for the Saudi petroleum industry, the prevalence of al-Qaeda and other nefarious groups amongst these refugees and the smuggling of drugs and munitions over national boundaries have complicated the relatively free crossings between the two countries. Underlying Saudi border concerns are long-standing Yemeni grievances against continued Saudi possession of the disputed border provinces of 'Asir, Najran, and Jizan, all three of which were annexed by Saudi Arabia after defeating Yemen in a 1934 war. The partial Saudi construction of a border fence and the increased presence of border guards has both managed to create an obstacle for Yemeni migration and has served to increase the anti-Saudi sentiments of Yemen's northern population. Saudi border policy since 2004 has placed the Kingdom on a collision course with the Houthi revolt.

Drones and al-Qaeda in the Arabian Peninsula

The *mujahidin*, or holy warriors fighting the Soviets in Afghanistan during the 1980s, were joined in their armed struggle against the Communists by thousands of Yemenis, many of whom were supported financially by Yemeni President Ali Abdullah Saleh. When these Yemenis returned home during the early 1990s, Saleh provided them a safe haven and the freedom to develop institutions for

religious education that subscribed to the ultraconservative Salafi Islamic sect. Construction of Salafi schools and mosques was funded by Saudi Arabia, which was steadily expanding its global presence through Salafi proselytization, a reflection of their domestic religious adherence. Saleh called upon his alliance with those returning from Afghanistan and their growing numbers of Salafi adherents during his 1994 war against southern secessionists and again from 2004–10 during his war against the Houthi movement in the north.¹⁷

On October 12, 2000, a small boat laden with explosives rammed into the *USS Cole*, which had moored in the southern Yemeni port of Aden for refueling, killing 17 US naval servicemen and awakening the world's attention to the growing presence of al-Qaeda affiliates in the country. Two years later on October 6, 2002, the French oil tanker *Limburg* was attacked off the Yemeni coast of Mukalla. Later that year, on December 30, 2002, three Americans working for the Southern Baptist hospital in the Yemeni city of Jibla, in the province of Ibb, were murdered by another al-Qaeda affiliate. These high-profile attacks were accompanied by the kidnapping of foreign tourists to Yemen, which increased the safety concerns for those few Westerners still traveling to Yemen. Concerns for the "Somalization" or fragmentation of the Yemeni state, convinced the US to rescind their earlier excommunication of Yemen from the realm of foreign aid, and begin a new aid program under the guise of the post-2001 "War on Terror."

There was no shortage of skeptics, who doubted that Ali Abdullah Saleh could ever be a reliable partner in the war with al-Qaeda. Saleh accepted US anti-terror money while at the same time supporting and arming Islamist militants. This policy first began during the 1980s when Yemen's government supported those joining the *jihad*, or holy war, in Afghanistan, and again during the 1990s when they were welcomed back.¹⁸ Bands of Islamists were even invited by Saleh to join the attack on the southern port city of Aden during the 1994 civil war and some even joined Saleh's government following reunification.

The first US drone strike was carried out in the Yemeni province of Marib on November 3, 2002, killing Abu al-Harithi, a suspected planner of the *USS Cole* attack. When this Predator drone fired a Hellfire missile at a car carrying six suspected members of an al-Qaeda cell in Yemen, it opened up a new era of warfare in the Middle East and North Africa. During George W. Bush's presidency, 5,000 drone strikes were ordered and under President Barak Obama this number increased five-fold.¹⁹ The normalization of extrajudicial killings during his administration was normalized to the extent that Obama was apparently quoted by his aids as stating, "turns out I'm really good at killing people. Didn't know that was gonna be a strong suit of mine," referring to the expanding military presence of drones in the Middle East and specifically in the Red Sea region.²⁰ The most controversial drone strike in Yemen was the killing of Anwar al-Awlaki in September 2011, for his role in organizing a number of attacks and recruiting for al-Qaeda through sermons and publications. Although American citizens had been killed as collateral casualties in the past, this was the first time an American citizen was targeted for an extra-judicial execution.²¹ The death of

Anwar al-Awlaki had the unintended consequence of stoking anti-American sentiments among the Awlaki tribe, one of the strongest and most populous tribes in South Yemen.²²

The drone policy was a boon to al-Qaeda recruitment in Yemen as footage of the post-attack carnage was used as anti-American propaganda. The 2006 escape of 23 al-Qaeda leaders being held in a Yemeni jail in Sana'a eventually led to the merger of the two al-Qaeda branches from Yemen and Saudi Arabia to form a united al-Qaeda in the Arabian Peninsula (AQAP) in 2009. The return of several al-Qaeda founding members, such as Said Ali al-Shiri and Muhammad Atiq Awayd al-Harbi, two former Guantanamo Bay detainees, pushed AQAP in a new direction. Starting in 2011, the organization no longer sufficed with terror attacks, but actively sought to seize and administer territory in the vulnerable southern and eastern portions of Yemen.

Condemnation of continued US drone strikes was made official by the current Houthi administration in Sana'a who claimed this as a violation of Yemeni sovereignty and refused to share intelligence information.²³ This is somewhat ironic as the Houthi movement's principal doctrinal opponent is the radical Salafi religious movement, which is often associated with al-Qaeda recruitment in Yemen. Potential US-Houthi cooperation in the struggle against al-Qaeda never came to fruition as it was overshadowed by the Saudi-Iranian conflict that was transposed on South Arabia.

The Arab Spring

In December 2010, events in Tunisia sparked the first public protests against the regime that quickly spread across North Africa and the Middle East in what became known as the Arab Spring. Yemen's government was not immune from these protests whose mass numbers were gathered through social media, a revolution in the mobilization of popular resistance. Across urban districts in Yemen, youth groups gathered in the streets to protest the 33-year rule of Ali Abdullah Saleh, the country's president who had become synonymous with the very fabric of the republic. When protests were met with violence in March 2011, Ali Muhsin al-Ahmar, Yemen's premier general and proponent of conservative Islam and the Islamist political party *Islah*, abandoned the Yemeni government and committed loyal troops to protect the protesters. Rather than a boon to the protest movement, Ali Muhsin's declaration of support managed to coopt a grassroots revolution as his presence made way for other opposition groups from more experienced political parties. *Islah* was joined by the Houthi tribesmen and members of *al-Hirak*, the southern secessionist movement in coopting the existing protests for their own political purposes.

The Arab Spring protests in Yemen officially came to an end with the resignation of Saleh in November 2011, according to an initiative spearheaded by the Gulf Cooperation Council (GCC). Saleh and his family were given immunity, while elections were scheduled for February 2012, featuring only a single candidate – Abd Rabuh Mansur Hadi, Saleh's Vice President, who received 99 percent of

the vote. Hadi presided over the National Dialogue Conference (NDC) from March 2013 through January 2014, which featured 565 delegates from all segments of Yemeni society. By the end of the conference, 1,400 recommendations were issued, constituting the NDC's vision for a future Yemeni constitution. The post-NDC reality was far different from that envisioned by the optimistic delegates. Few of the liberalizing reforms were implemented as the political elite remained entrenched in Sana'a even as the rest of the country erupted in violence and continued protest.²⁴

Conspicuously absent from the NDC was the *al-Hirak* southern secessionism movement which chose to boycott the government's transition deliberations. This was unfortunate as Hadi used the post-NDC optimism to declare a particularly contentious division of the country into six federal regions. The former north and south Yemeni states were each divided into three regions. Hadi's federation plan targeted the Houthis and *al-Hirak* specifically by using this three-region division of their territorial base as a way to eliminate a unified opposition to Hadi's transitional government.

The Houthi tribesmen began their march southwards towards the capital city of Sana'a shortly after the end of the NDC, conquering key tribal regions along the route. In September 2014, the Houthis arrived in Sana'a and over the subsequent months demanded political concessions from Hadi's government.

In Tunisia and Egypt, the Arab Spring protests were focused on a single united nationalist theme, while in Yemen, the protest were merely another medium for the manifestation of regional conflicts in the country's northern and southern peripheries. Saleh's misrule and corruption helped inflame the anti-government protests of *al-Hirak* and the Houthi movement, both of which began several years before the Arab Spring protests erupted. The collapse of Saleh's regime and the entirety of the Yemen republican government was a result of regional threats and fissures rather than solely a popular movement in the streets of Sana'a.²⁵

Saudi air campaign (2015)

Yemeni President Mansur Hadi's failure to propose a new constitution that would placate the concerns of opposition groups in both the north and south of the country, led to a complete failure of the transition government which was gradually overrun by Houthi tribesmen. Hadi's desperate escape from house arrest in Sana'a and then evacuation from Aden before the arrival of the Houthi militias, placed him squarely in the crosshairs of Saudi Arabia and the US who were more concerned with border security and counterterrorism than the legitimacy of the Yemeni government. After the onset of the Yemen civil war in March 2015, Saudi Arabia was formally invited by Hadi to intervene militarily to maintain his government in exile, while he sat comfortably in a luxury hotel in Riyadh. The Saudis formed a military coalition, consisting of ten other formal members, and received a blank check from the UN Security Council to defend Hadi's government, the only internationally recognized authority in Yemen,

despite Hadi's presence in exile. UN Security Council Resolution (UNSCR) 2216 provided tacit approval to Saudi Arabia's military strategy in Yemen and held the Houthi leadership solely responsible for the failure of the post-Arab Spring transitional government.

Operation *Decisive Storm*, the Saudi-led airstrike and military intervention in Yemen, officially began on March 26, 2015. The Houthi capture of Aden two months earlier had presented the gravest threat to Saudi dominance of the Arabian Peninsula as it would have completed Houthi dominance of Yemen and marked a virtual end to Hadi's presidency. Saudi Arabia's military used UNSCR 2216 as a justification for any and every level of intervention in Yemen, including the indiscriminate bombing of civilian targets remotely connected with the Houthi movement. The resolution demanded the restoration of Hadi's government in exile and called upon the Houthi tribesmen to unilaterally disarm and relinquish all "occupied territories" in North and South Yemen. The Saudis further argued that their aerial and ground campaigns were necessary to defend Saudi Arabia's southern border and prevent Iran from establishing a strategic stronghold in South Arabia through their Houthi allies. This final motivation factor was used to garner US diplomatic and logistic support for the campaign which was couched in a bipolar Saudi-Iranian rivalry.²⁶

UNSCR 2216 and Saudi strategic motivations were difficult to implement as it is exceedingly impossible to disarm a tribal population that takes great pride in its arsenal and there was no clear delineation of occupied territories versus those areas with indigenous population allied with the Houthi movement. On a more fundamental level, Hadi's government in exile lacks legitimacy within Yemen and there is no definitive evidence as to the Houthi-Iran relationship. Even after the operation was renamed *Restoring Hope* and ostensibly shifted its focus on humanitarian assistance, Saudi Arabia continued its bombing campaign and accomplished few of the goals as delineated by UNSCR 2216 and the initial goals of the Saudi coalition. The air campaign proved ineffective at pacifying the Houthi rebellion and actually led to cross-border retaliatory raids and the launching of Scud missiles at Saudi targets, thereby destabilizing Saudi Arabia's southern border. In July 2015, as part of a coordinated land offensive with Emirati forces and a cadre of Yemeni fighters, the Saudis began operation *Golden Arrow* as an amphibious landing in the port of Aden to retake the southern half of the country.²⁷ The ground invasion and continued aerial attacks have produced few lasting territorial or political gains aside from costly battles along strategic frontlines like the western port of Hodeidah and the southern city of Ta'iz.

The humanitarian crisis and the images of starving Yemeni children have garnered the most international critique leveled against Saudi Arabia's Operation Decisive Storm and the subsequent land invasion of southern Yemen. An independent investigative team was formed in September 2017, whose findings pressured the UN Security Council to issue its first condemnation of Saudi Arabia's actions and call for an end to the embargo on humanitarian aid and allow for the free flow of goods through Yemen's ports and airports.²⁸ Even as

the UN Special Envoy to Yemen continues to champion Yemen peace talks in Europe, little progress has been made on solving the underlying political grievances that first inspired the Houthi movement during the 1990s.

Ali Abdullah Saleh, Yemen's deposed president, but still the most prominent and recognizable political figure in the country, emerged as a surprising ally of the Houthi movement. This was surprising, precisely because Saleh and the Houthi family had fought six costly conflicts between 2004 and 2010. The two sides were able to arrive at a temporary truce, united by a common enemy in the Muslim Brotherhood-affiliated Islah Party which rose to political prominence following the 2012 National Dialogue Conference. This alliance of convenience was significant because it supplemented small tribal arms caches with heavy weaponry operated by Yemen's Republican Guard troops that remained loyal to Saleh. The temporary truce expired with the tribal assassination of Saleh in December 2017, as it appeared that Saleh had been contemplating a diplomatic solution to the conflict, potentially undermining the political gains achieved by the Houthi movement.

The Horn of Africa

The two sides of Bab al-Mandeb have shared a history, population movements, and a cross-straits economy for centuries. According to Yemeni and Ethiopian tradition, the first coffee beans traversed the Red Sea from Ethiopia and were replanted in the highlands of Yemen during the sixteenth century. Various modern diplomatic initiatives were undertaken during the 1970s, to form a united anti-Communist front under Yemeni president Ibrahim al-Hamdi. Military confrontation was also not uncommon as Yemen and Eritrea clashed in December 1995 over sovereignty rights over the Red Sea Hunaish Islands and access to valuable natural resources. International mediation eventually awarded the islands to Yemen, but nonetheless served as the impetus for the formation of the Sana'a Cooperation Forum in 2002, a loose coalition of Sudan, Ethiopia, Djibouti, and Yemen united against Eritrea.²⁹

Similar to the situation in Yemen, Somali political stability has been undermined by domestic fissures and regional conflicts that have plagued the country since the founding of an independent republic in 1960. Regional relations during the presidency of Muhammad Siad Barre (1969–91) were guided by visions of a "Greater Somalia" which included ethnic and historical Somali populations living in Djibouti, Ethiopia, and Kenya. Siad Barre's nationalist and expansionist foreign policy led to costly border wars with Kenya and Ethiopia, during which South Yemenis volunteered to fight in defense of the communist People's Democratic Republic of Ethiopia. Those same border conflicts remain a serious factor in the ongoing Somali civil war which began in 1991 following the end of Siad Barre's presidency. The colonial boundaries established during the 1960s and 1970s remain a source of insecurity in the Gulf of Aden, as national borders divide contiguous clan territory. Neighboring countries of Ethiopia, Kenya, and Djibouti have responded to the emergence of local warlords and international

terrorist groups in Somalia with numerous attempts at creating secure borders and buffer zones between their own national borders and Somalia. For example, in 2007, Ethiopia invaded Somalia in response to attempts by nationalist groups to seize the Somali-inhabited Ogaden region of eastern Ethiopia.³⁰

The increasing isolation of Somalia from the rest of East Africa has served to further highlight the domestic divisions that have fractured the notion of a centralized state. Although Somalia is constituted by a relatively homogenous Somali population, the clan divisions have only become more entrenched since the departure of Siad Barre as clan identities have come to replace a sense of shared national identity.³¹ Somali clans differ from Middle Eastern tribes in their emphasis on common ancestry and the hereditary position of the clan leader. Somalis grow up memorizing 20–30 generations of male descendants, tracing back their families to a common ancestor. The family-based structure of clans has led to the gradual formation of sub-clans and increasingly common intraclan conflicts over natural resources. This is in contrast to Yemeni tribes which infrequently have intratribal conflicts of a long duration and have historically formed tribal alliances to pool resources, militias, and domestic political power.³² Yemen's northern highlands, in particular, are dominated by two tribal federations – Hashid and Bakil. Somalia is divided into six main clans: Digil, Rahanweyn/Mirifle, Hawiye, Dir, Isaaq, and Darod. Each clan claims descent from a central Arabian historical figure who interacted with the Prophet Muhammad and whose progeny later migrated to the Horn of Africa.³³ A popular Somali proverb is often used to describe the complex relationship between Somali clans and the state: “Me and my clan against the world, Me and my family against the clan, Me and my brother against my family; Me against my brother.”

Local conflict in Somalia is driven by access and control over water resources and grazing land, both of which are scarce in the country's arid rural areas. After the collapse of the central government during the early 1990s, the practice of land-grabbing, power politics based on clan-affiliation, and the absence of conflict resolution or law enforcement have led to cycles of violence motivated and carried out by clan members seeking revenge or using violence as a means to acquiring territorial rights. Clan and community elders regularly employ the tenets of *xeer*, or Somalia's traditional customary law, in resolving disputes, although this has not sufficiently addressed the absence of a state-based legal code for territorial rights.³⁴

Terrorism and drones

Yemen and the Horn of Africa are tied together by more than geography, economy, history, and politics. The radicalization of segments of the population and the emergence of militant groups in each country has attracted US drone strikes targeting movement leaders. AQAP is the principal group in Yemen while Somalia is dominated by *Harakat al-Shabaab al-Mujahideen*, or “the Movement of Striving Youth,” known simply as al-Shabaab. The country was overrun by a bloody civil war between 1991 and 2006, that embroiled the surrounding nations

of Kenya, Ethiopia, and Djibouti, and precipitated a refugee crisis as half a million Somalis sought to escape the violence abroad.

Similar to the emergence of al-Qaeda in Yemen, al-Shabaab traces its origins to the veteran jihadis returning from Afghanistan equipped with weapons and combat training. Although al-Qaeda's leader Osama bin Laden maintained contact with these jihadis during his residence in Khartoum, Sudan during the 1990s, al-Shabaab did not formally join al-Qaeda until 2010. Refugee camps, like Dadaab in Kenya, were principal recruiting grounds for al-Shabaab, who also resorted to recruiting teens to serve in their frontlines. Al-Shabaab's June 2013 bombing of a UN compound in Mogadishu killed 22 people and garnered the alarm of the US and other international organizations. Al-Shabaab is notorious for its brutality, both in carrying out terror attacks and implementing strict religious codes in Somali society.³⁵

In December 2002, the US opened Camp Lemonnier, a new US Naval base in Djibouti, to act as the primary base of operations for the US Africa Command and as the coordinator of counterterrorist multi-force operations in East Africa. Lemonnier also served as the aerial drone base, coordinating strikes in Somalia, Yemen, and terrorist training camps in the vicinity of the Red Sea and East Africa and earning the title of the "busiest Predator drone base outside of Afghan war zone."³⁶ Drone attacks coupled with Kenyan ground forces have not succeeded in eliminating the al-Shabaab threat as the organization continues to carry out brazen attacks against Kenyan military sites and civilian target. The January 2019 attack on an upscale hotel complex in Nairobi is only the latest example.³⁷

The concept of Greater Somalia continues to be a factor in domestic politics and regional relations. Rather than being solely a sense of Somali nationalism or pride in the possession of ancestral and clan-based territory, a new Islamo-Nationalism has emerged. Militant Islamist groups like al-Shabaab have portrayed themselves as the defenders of Islamic Somalia from the Christian invaders arriving from Ethiopia, Kenya, the African Union, the US, and the UN. Not all Somalis support the beliefs and goals of al-Shabaab and, in fact, a growing majority of the civilian population is appalled by the senseless bloodshed such as a suicide bombing at a December 2009 graduation ceremony for medical doctors, that killed 20 people, in a country that has one of the worst doctor-patient ratios in the world. The lack of popular support has prevented al-Shabaab's emergence as a potent political force in Somalia, forcing the organization, instead, to formally unify with al-Qaeda in 2010, thus creating a terrorist organization responsible for continued bombings in Somalia and in surrounding nations. Kenya, in particular, has been the target of many of the highest profile attacks such as the Westgate Shopping Mall in 2013 and the 2014 twin bombings of an outdoor market in Nairobi.³⁸ Between 2011 and 2016, counterinsurgency campaign, drone attacks, and the efforts of the African Union Mission in Somalia (AMISOM) have reconquered territory held by al-Shabaab, disrupted financial support for their organization, and reduced their popular support. Nevertheless, since 2016, al-Shabaab attacks on civilian, political, and military

installations in Kenya, Ethiopia, and Somalia continue unabated and threaten to destabilize the Horn of Africa.³⁹

Red Sea arms market

Since the late 1880s, weapons smugglers have traversed Bab al-Mandeb and the Arabian and Red Seas carrying arms to conflict zones in search of profit. Merchants from Aden sold arms to Menelik II, the first Emperor of Ethiopia from 1889 to 1913. Aden, in turn, became a hub for weapons transfers by international terrorist organizations like the Popular Front for the Liberation of Palestine during the 1970s. With the end of the Cold War and the unification of North and South Yemen in 1990, stockpiles of PDRY Kalashnikovs made their way onto the regional arms market and ended up in Somalia at the onset of a costly civil war in 1991.⁴⁰ Even Osama bin-Laden, the Yemeni founder of al-Qaeda, used the porous maritime borders between Port Sudan and Aden to ship weapons, money, and jihadis over a metaphorical “naval bridge.”⁴¹

The UN Arms Embargo on Somalia which has been active since 1992 has done little to curb the weapons smuggling from Yemen.⁴² Prior to the current conflict, there were hundreds of thousands of Sudanese refugees in Yemen actively participating in the illegal weapons trade across the Gulf of Aden and benefiting from Yemen’s massive arms market. Since the onset of the Somalia civil war in 1991, Yemen has granted automatic refugee status to Somali nationals, whose numbers range from an official UN High Commissioner for Refugees count of 170,000 to a local estimate of close to 1 million. The port town of Bosaso on Somalia’s north coast has used the legitimate livestock trade with Yemen and Saudi Arabia as a guise for the import of weapons by sea and air. On the other end of the route, an airfield and port in the southern Yemeni port city of Mukalla loads the cargo planes and sea craft with munitions for the return voyage to Somalia.⁴³

This munitions industry in Somalia has helped fuel an ongoing civil war and an increasing number of terrorist attacks by the local al-Qaeda cell. Somalia had its own version of the *USS Cole* attack in 2002 when three operatives drove an explosive-laden vehicle into the Paradise Hotel in Mombasa, Kenya, killing 13. Intelligence estimates have linked some of the individuals involved in the 2002 Mombasa attacks with 1998 twin bombings of the US Embassies in Nairobi, Kenya and Dar al-Sallam, Tanzania. Members of al-Qaeda’s cell in East Africa were eventually folded up into the Islamic Courts Union (ICU) which politically and militarily dominated southern Somalia until a 2009 reconciliation with the Somali government.⁴⁴ A number of extremist groups broke off from the ICU to form radical groups like al-Shabaab and Hizb al-Islam who continue to fight a religious war against the Somali government. As an organization, al-Shabaab received a boost of support following the onset of a particularly brutal Ethiopian invasion in early 2007 which claimed the deaths of more than 6,000 civilians and displaced 600,000 Somalis. The birth and proliferation of Somali insurgency was a direct consequence of increased recruitment driven by a call to arms

against the Christian Ethiopian invaders. The world's attention was further awakened to the problem of al-Shabaab on June 3, 2007 when an operative crashed a Toyota Land Cruiser packed with explosives through the security gates in front of Somali Prime Minister Ali Muhammad Gedi's residence in Mogadishu. Although Gedi survived, in what amounted to the fifth attempt on his life, this marked the beginning of Somali suicide bombings targeting senior leadership and civilian venues.⁴⁵

In Yemen, on the other hand, it was the Houthi movement that finally dismantled the religious and education networks established by the country's Salafi population, some of whom were avid supporters of al-Qaeda. Years of drone attacks had only targeted known al-Qaeda operatives, while doing very little to address the root causes of extremism and their methods of recruitment. In 2014, the Houthis destroyed the Salafi Dammaj School in the northern city of Saadah and al-Iman University in Sana'a, both institutions which had earned nefarious reputations for their radicalization of prominent al-Qaeda members such as Anwar al-Awlaki.

Conclusion

Both Yemen and Somalia are evolving during their respective civil wars into multiple states within prescribed national boundaries rather than a single unified state. The popular notion of Greater Somalia and the territorial claims made by neighboring countries continue to serve as a destabilizing component in Horn of Africa politics. Similarly, Yemeni territorial claims on three disputed provinces along the Yemen-Saudi border continue to present a cause for concern in South Arabia.

The cost of conflict in Somalia over the past three decades is not limited to the tangible numbers of casualties or the value of destroyed property but includes the deep psychological trauma of an entire generation of Somalis whose lives have been bereft of political and social stability normally associated with a functional state providing basic services. The scarcity of entrepreneurship and investment during this elongated civil war has further stunted the country's growth, adding obstacles to national recovery. Even as the multinational African Union Mission in Somalia has cooperated with Somali troops to expel the al-Shabaab armed insurgency from the main population centers in the country, the group has evolved its military tactics and broadened its target area to undermine Somali and neighboring state authority through brazen and deadly terrorist attacks. Any future solution to the Somali conflict must include political reform that addresses the underlying issues that promote al-Shabaab popularity including corruption, abuse of power, lack of education and employment, absence of rule of law, and an overall high level of poverty. This is especially true for the 50 percent of the population which is under the age of 15 and has been presented a grim reality with limited opportunities to achieve the success or even to extricate themselves from the cycle of destitution and violence.⁴⁶

In a similar fashion, Yemen has scarcely benefited from its location alongside one of the most strategic and lucrative global waterways. Indigenous political

corruption and regional competition over access to Yemen's geographic assets have presented obstacles to modernization for the most populous country in the Arabian Peninsula. Any lasting peace will need to give Yemenis the space needed to arrive at their own political solutions while at the same time offering the international economic aid necessary to rebuild the country and assure future decades of prosperity and stability.

Notes

- 1 Lewis (2015), pp. 2–3.
- 2 Orkaby (2017).
- 3 Stookey (1978), pp. 253–260.
- 4 Dresch (2000), pp. 124–140.
- 5 Mawby (2005), p. 3; Orkaby (2014), p. 70.
- 6 Halliday (1990), pp. 64–68; Stookey (1982), p. 73.
- 7 Brehony (2011), pp. 64–80.
- 8 Rabi (2015), p. 121.
- 9 Bonnefoy (2018), p. 31.
- 10 Day (2010), pp. 64–66.
- 11 Day (2010), pp. 61–62.
- 12 Day (2012), pp. 2–3.
- 13 Freeman (2009), pp. 1009–1010.
- 14 Day (2012), p. 86.
- 15 Ripley (2010), pp. 250–256.
- 16 Knights (2018), pp. 15–24.
- 17 Scahill (2013), pp. 62–63.
- 18 Bonnefoy (2018), p. 35.
- 19 Rinehart (2016), p. ix.
- 20 Michael B. Kelley, “Last Year President Obama Reportedly Told His Aides That He’s ‘Really Good At Killing People’,” *Business Insider*, November 2, 2013, accessed February 7, 2019, www.businessinsider.com/obama-said-hes-really-good-at-killing-people-2013-11.
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- 23 “Al Awlaki Tribes Warn of Consequence of Cooperating with America in Killing Awlaki,” *Mareb Press*, April 8, 2010 [Arabic], accessed February 7, 2019, www.marebpress.net/news_details.php?sid=23858.
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- 25 Heinze (2018), pp. 15–17.
- 26 Day (2012), pp. 5–6.
- 27 Shield (2018), pp. 463–464.
- 28 Shield (2018), pp. 465–468.
- 29 Bonnefoy (2018), p. 68.
- 30 Bonnefoy (2018), p. 52.
- 31 Solomon (2015), p. 52.
- 32 Grant (2012), p. 65.
- 33 Lewis (2015), pp. 10–11, 18–19.
- 34 Anderson (2010), p. 6.

- 34 Keating and Waldman (2018), pp. 10–12.
- 35 Rinehart (2016), pp. 65–70.
- 36 Rinehart (2016), pp. 71–72.
- 37 “Major al-Shabab Attacks Targeting Kenya,” *Al-Jazeera*, January 15, 2019, accessed February 7, 2019, www.aljazeera.com/news/2019/01/major-al-shabab-attacks-targeting-kenya-190115143008990.html.
- 38 Solomon (2015), pp. 56–58.
- 39 Jones et al. (2016), p. x.
- 40 Hill (2017), pp. 89–90.
- 41 Scheuer (2006), p. 137.
- 42 SIPRI (2018).
- 43 Hill (2017), pp. 94–101.
- 44 Scahill (2013), pp. 118–119.
- 45 Scahill (2013), pp. 224–225.
- 46 Keating and Waldman (2018), pp. 2–5.

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16 South Africa¹

Theo Neethling

Introduction

Exactly half of the South African Air Force's fleet of Gripen fighter jets is actively flying while the other half is in rotational storage due to a lack of funding.²

This was the report from Defense and Military Veterans Minister, Nosiviwe Mapisa-Nqakula, when she responded to a parliamentary question on 6 June 2016.³ The fact that 12 out of the 26 Gripen fighter jets – the flagship squadron of the South African Air Force (SAAF) – were in long-term storage is of great significance as it is a testament of at least two most important political challenges pertaining to the matter of air power in South Africa in general and the role and function of the SAAF in particular.

First, it should be understood that in the mid-1990s, the post-apartheid SAAF was confronted with the reality that it did not have a modernized force to speak of. The final years of apartheid also saw increasing internal civil instability. Consequently, budget shifts were made towards strengthening the army and police. As a result, the main equipment of the SAAF and the South African Navy (SAN) was allowed to run down, and both these arms of the service desperately needed rejuvenation and modernization by way of new equipment. This explains and underlies the purchasing of new Gripen aircraft for the SAAF (as well as new submarines and corvettes for the SAN) towards the end of the 1990s by the post-apartheid government.

However, many observers and analysts were critical about a too heavy focus on “external aggression” in post-apartheid South Africa (i.e., after 1994), and what was perceived as an overconcentration of defense spending on the conventional military capabilities of the South African National Defense Force (SANDF). This eventually posed a serious institutional and force design dilemma to the SAAF and the SAN. The problem was that defense policy prescriptions required the SANDF to modernize and strengthen its conventional capabilities in the framework of the so-called “primary function domain” of the military. At the same time, changing political realities in the regional landscape have increasingly been linked to expectations and requirements pertaining to

involvement by the SANDF in international peacekeeping operations on the African continent, which was (until recently) specified as a “secondary function” of the SANDF. In this regard, some critics and defense analysts argued that the SAAF was equipped for “the most improbable of primary missions”⁴ and thus not geared for the demands of a regional peacekeeping role.

Second, in post-1994 South Africa, a large or substantial portion of politicians and ordinary South Africans has constantly questioned procurements for the modernization of the military in view of dire socioeconomic challenges, specifically health, housing, education, and employment in the country. Many South Africans argue – on the basis of socioeconomic needs in South Africa – that defense spending in South Africa, which has dwindled to around 1.1 and 1.2 percent of the gross domestic product (GDP) since 2010,⁵ is (still) too high for a developing country where acute poverty and desperation are the order of the day. In this context and in view of severe budgetary constraints, the usefulness of the SAAF as a foreign policy instrument has been curtailed, and the issue of socio-economic challenges has increasingly been of the utmost political importance with regard to the role and functioning of the SAAF as a foreign policy instrument of the South African government.

Third, despite the above-mentioned modernization of the SAAF, a steady erosion of the conventional capabilities of the SANDF increasingly became a grim reality since the 1990s. The dwindling and lean SANDF budget since the 1990s also had a very negative effect on the retention of highly skilled soldiers, particularly in the SAAF and SAN as the more technologically intensive arms of the service in the SANDF. In an unprecedentedly frank interview, a former Chief of the SAAF, Lieutenant General Carlo Gagiano (2005–2011), raised his concern – even delivered a damning verdict – about the deficiencies in the Air Force defense capability:⁶

- The budget for the Hawk squadron, used to train pilots to fly Gripen fighter jets, was not enough to keep the aircraft airborne for 2,000 flying hours a year, i.e., half the optimal flying time.
- The air force could not afford a permanent maintenance contractor for its aircraft.
- There were delays of more than a year in obtaining spare parts for aircraft.
- There were an insufficient number of trained pilots, instructors, and ground crew to ensure a sustainable core of fighter pilots.
- The SAAF’s force of 26 Swedish Gripen fighters would only be able to fly for a total 250 hours a year, i.e., enough to train one pilot to NATO standards.

Against this backdrop and further to the above, this chapter will concentrate on the following: first, the role of the SAAF in the dynamic post-1994 politico-military landscape; second, the challenges facing the SAAF in relation to changing regional realities since 1994; and last, contemporary public perceptions and socioeconomic challenges in South Africa that are politically constraining the SAAF in its current role and strategic responsibilities.

Before these matters are explored, a cursory background section will introduce the reader to South African post-apartheid regional security context and the role and function of the SAAF in this regard.

Background: the post-1994 South African military and security landscape

The history of the SAAF dates back the 1920s.⁷ In this chapter, the focus will be on the contemporary history of the SAAF since South Africa's watershed transition in 1994. In this regard, it should be understood that the negotiated transition of South Africa to democracy during the 1990s brought about a new context in terms of military posture and engagement – and this increasingly affected matters pertaining to the force design, posture, and role of the SAAF.

In 1994, the new South African government – with former President Nelson Mandela as head of state – wished to identify South Africa with the promotion of human rights, peace, and development on the African continent.⁸ The government thus wanted to distance itself from the country's past of regional power politics and political-economic dominance over Southern Africa. A low-risk regional approach and policy was introduced that not only revived regional and wider international diplomacy, but also deliberately placed limitations on and reduced the use of the military instruments in South Africa's foreign policy. The Thabo Mbeki era (1999–2008), however, brought about the re-emergence of the military instrument in South Africa's foreign policy. South Africa's national interests were strongly attached to the African continent,⁹ and the military was chosen to facilitate South Africa's foreign policy goals in Africa.

In view of the above, *Defence Review 1998*, which was perhaps the most important post-1994 policy document in the defense domain, stated that, after two and a half decades of international isolation, post-apartheid South Africa was readmitted into the international community. The compilers of *Defence Review 1998* pronounced South Africa's common destiny with Southern African states and made it clear that peace and stability in South Africa could only be achieved in a context of regional stability and development. They also anticipated that the SANDF would be required to participate in regional defense arrangements and engage in peacekeeping operations.¹⁰ Against this background, Esterhuyse¹¹ states that in the post-1994 South African arena of defense diplomacy – considering the importance of peace and security in South Africa's foreign policy outlook on the continent – the SANDF became a leading actor or instrument in South African foreign policy in Africa during the Mbeki era.

Having determined its policy framework on participation in peacekeeping operations, the South African government decided to involve the SANDF operationally in United Nations (UN) peacekeeping operations in two African states, namely the internationally brokered peace process between Ethiopia and Eritrea, specifically the UN Mission in Ethiopia and Eritrea (UNMEE), as well as the UN Organisation Mission in the Democratic Republic of Congo (DRC), generally known by its French acronym, MONUC. This was a historical development

as the SANDF made its first substantial contributions to international peace-keeping operations from 1999 onwards. These developments also coincided with the deployment of South African troops in Burundi towards the end of 2001 as part of an African Union (AU) mission.¹² Since then, South Africa's contributions as a troop-contributing nation in international peace missions have expanded and grown considerably.

With the drafting of the White Paper on Participation in International Peace Missions (1999), which followed *Defence Review 1998*, it was indicated that the SANDF's participation in peace missions would be "at the level of up to one infantry battalion group."¹³ In hindsight, this clearly indicates an under-estimation of the role that was awaiting the SANDF, and the said policy stance was soon overtaken by events in Burundi, the DRC, and Sudan/South Sudan.

Approaching the end of the 2000s, with 2,178 men and women involved in UN peacekeeping operations,¹⁴ South Africa had moved into the league of those troop-contributing nations who were assigning substantial numbers (more than 2,000) of uniformed personnel to UN peacekeeping. From this perspective, peacekeeping became the center focus of SANDF external operations. It should be understood that this inevitably affected the role of the SAAF as an element or section of the SANDF, as the unfolding discussion below will further clarify.

Budgetary constraints, the demands of secondary tasks, and the upgrading of the SAAF

At this point in the discussion, two further aspects should be clear as a matter of historical perspective and understanding. First, as already indicated, the final years of apartheid saw increasing civil disobedience and low-level guerrilla activity in South Africa's townships. Therefore, budgets were shifted to favor the army, police, and counter-revolutionary social spending. Eventually, the main equipment of especially the SAAF and SAN did no longer serve their purpose as diplomatic instruments in a changing security landscape and further did not meet the required high military standards expected of a regional power such as South Africa.¹⁵

Second, since the early 1990s, South Africa, in common with most of the international community, witnessed a reduction in defense expenditure. This also coincided with the demise of the apartheid political system. Specifically, defense spending averaged 16.4 percent of the State's budget in the 1980s. It ranged from a high of 22.7 percent in 1982 to 13.7 percent, but rose to 15.7 percent of State spending in 1989. By the mid-1990s, defense spending had been reduced to less than 10 percent of total State spending.¹⁶ It soon became evident that the SAAF and the SAN desperately needed some rejuvenation by way of new equipment.¹⁷ The predicament of the SAAF was strikingly articulated by Barrel:¹⁸

The air force's difficulties are similar. Because of the age of the equipment and shortages of spares, the air force is battling to maintain an effective deterrent and a minimal fighting component in the air. A significant proportion of

attack craft – about 12 Impala fighters/trainers, 22 Mirage fighters, and 14 Cheetahs (South African-built variants of the Mirage) are out of commission or have been scrapped.

In order to modernize the SAAF and the SAN,¹⁹ a Cabinet decision was taken on 18 November 1998 that South Africa would procure the following military equipment:²⁰

- nine dual-seater Gripen and 12 Hawk aircraft from British Aerospace/SAAB to replace the SAAF's Cheetah and Impala aircraft. A further option was taken on the balance of 12 Hawk aircraft and 19 single-seater Gripens;
- 30 light utility helicopters from the Italian helicopter manufacturer, Agusta, which would replace the Alouette helicopters (which had been in service since 1962);
- four patrol corvettes from a German frigate consortium to replace the present aging strike craft of the SAN (which had been in service since 1979); and
- three submarines from a German submarine consortium to replace the aging Daphne submarines (which had been in service since 1971).

Again, it should be noted that South Africa's involvement in international peacekeeping operations was officially regarded as a secondary function (non-conventional) of the SANDF. Yet, several authoritative defense analysts critically argued that there was an obsession with the primary function in force planning. They maintained that it was primarily in the secondary functions arena that most militaries had been deployed in the post-Cold War era. By the same token, it was asserted that the South African military of the future should be increasingly configured around non-traditional roles or secondary functions.²¹

In view of this, it does not surprise that several critical voices were raised in objection to the South African government's arms procurement project, known as the Strategic Arms Package (SAP), which was finalized towards the end of the 1990s. In the words of Sylvester and Seegers, "the SAP has equipped the South African Air Force (SAAF) and the South African Navy (SAN) for the most improbable of primary missions. The equipment is also not very relevant to secondary missions."²²

Thus, criticism of the SAP was aimed especially at the policy focus and related emphasis on the strengthening of the conventional capabilities of the SANDF, noting that the military – including the SAAF – was more likely to be employed in its secondary tasks, most specifically peacekeeping operations, as a non-conventional role. The purchasing of new jet fighters and submarines especially provided strong ammunition for critics of the SAP, as opposed to the corvettes and utility helicopters that were viewed more positively.²³ These matters are discussed further in the next section.

Further perspectives on the modernization of the SAAF since 1990

Amid concerned whispers of a weakened military in South Africa, it is of interest to study military data taken from public domain print and other user contributions. Data from Global Power Firepower (GFP) indicates South Africa's military as the 33rd "strongest" worldwide and the 3rd "strongest" in Africa, below Egypt (12th) and Algeria (23rd). At the same time, South Africa finds itself ahead of Nigeria (43rd), Angola (48th), and Ethiopia (51th). The country is listed on the basis of an active military force of 78,050, with 16,000 in reserve.²⁴ As far as air power is concerned, the SAAF had the following fixed-wing and rotary-wing aircraft:²⁵

In 1989, the SAAF had at least 801 aircraft and helicopters of 24 types. The SAAF had 11,000 personnel and 317 combat aircraft (43 Mirage F-1s, 50 Cheetahs/Mirage IIIs, five Buccaneers, seven Canberras, 92 Impala Mk IIs, and 120 Impala Mk Is). The SAAF also had 130 T-6G Harvards, 34 AM-3C Bosboks, 20+ C-4M Kudos, 20 Cessna 185s, 19 Albatrosses, four Boeing 707-320s, nine Transall C-160s, seven Lockheed Martin C-130 Hercules, seven DC-4 Skymasters, 39 C-47 Dakotas, four HS-125-400Bs, two Falcon 50s, one Cessna Citation II, one Viscount, eight Wasp helicopters, 95 Puma/Oryx helicopters, 14 Super Frelon helicopters, and 70 Alouette helicopters.²⁶

In 1994, after the country's major political transition from apartheid to a fully democratic state, the SAAF became part of the newly established SANDF. The SAAF had 636 aircraft and helicopters of 26 types. The reason is that several squadrons had been disbanded and a number of bases and units had been closed down. Several aircraft had been withdrawn from service, including the remaining Buccaneer, Canberra, Transall C-160, DC-4 Skymaster, Bosbok, Kudu, and Albatross fixed-wing aircraft, as well as the remaining Super Frelon and Wasp helicopters.²⁷

However, for the SAAF there were also new and positive developments in its process of continuous modernization. Already in the 1980s, the SAAF identified the need to acquire attack helicopters. The first prototype was flown in 1990 and the result was a locally designed and built Rooivalk attack helicopter. Initially, a need was registered to acquire 36 such helicopters, but only 12 were built in the

Table 16.1 Air power

	<i>Total</i>
Fighter aircraft fixed wing	17
Attack aircraft fixed-wing	17
Total helicopter strength	94
Transport aircraft	100
Trainer aircraft	67
Attack helicopters	12

end by Denel, a South African state-owned aerospace and defense technology conglomerate. Officially, these helicopters were handed over to the SAAF in November 1998,²⁸ and they were particularly useful in the eastern DRC where the UN peacekeeping operation was given a mandate to conduct offensive operations against the armed groups that operated in that part of the country.

More specifically, three Rooivalk helicopters were utilized in the combat reconnaissance and close air support roles to assist both the UN Force Intervention Brigade (FIB) and the DRC government in offensive actions against armed forces threatening peace in the eastern parts of the country. Since its establishment in 2013, the FIB consists of some 3,000 troops from South Africa, Tanzania, and Malawi and acts as the sharp end of MONUSCO, the UN peacekeeping mission in the DRC.²⁹ As such, the South African Rooivalk helicopters have been utilized as a specific tool by the force commander of the FIB in offensive military actions relating to the work of the intervention brigade,³⁰ which highlighted the role of South Africa as an actor in African peacekeeping operations. The Rooivalk helicopters were complemented by five South African Oryx helicopters (a remanufactured and upgraded version of the Aérospatiale Puma) in terms of troop and medium transport tasks.

The first deployment of Oryx helicopters to the DRC took place in 2003, followed by the Rooivalk deployment in 2013 against the backdrop of an intensification of UN operations against rebel forces in the eastern parts of the country.³¹ The Rooivalk helicopters flew the craft's first-ever combat mission in November 2013, and fired multiple 70mm rocket salvos against rebel bunkers in a mountainous region close to the Rwandan border.³² This being said, the Rooivalk proved to be a notable and most useful asset in MONUSCO's FIB efforts to defeat the rebel groups destabilizing the eastern parts of the DRC. In fact, the Rooivalk widely earned respect as an effective and well-utilized weapon. The Rooivalk is even regarded a better aircraft than the other attack helicopter in service with the UN, the Mi-24, partly as a result of pilot training and partly because of the craft's superior range and endurance. In recent years, the most combat hours were flown in 2015, with 17.2 hours in six live engagement sorties. During these sorties, the three Rooivalks fired 255 rounds of 20mm ammunition and 456 rockets.³³

Apart from the Rooivalk helicopters, no analysis of the SAAF can be complete without a proper discussion of the crown jewel in the SAAF, namely the Gripen fighter jets. Towards the end of 1997, the SAAF's Mirage F-1s, which played a significant role in the Angolan war in the 1980s, were all withdrawn from service. The SAAF's Cheetah jets followed a decade later and in 2008, they were all withdrawn from service. With the new Gripens (17 single-seat Gripen Cs and nine two-seat Gripen Ds), the SAAF had a fair number of new, modern and sophisticated fighters in its inventory.³⁴ The Gripen is a sleek and modern fighter aircraft capable of modern generational air warfare, and the 26 Gripens provide the SANDF with an array of military options that never existed with the older jets.³⁵

Despite the high cost for South Africa as a developing country, functionaries and role players in the broader military establishment were convinced that the

Gripen aircraft was much needed to modernize the post-1994 SAAF. They argued and still remain firm in their view that the SAP did not represent any new capability that did not previously exist: "Fighter jets replaced fighter jets" and as such, older equipment that had experienced major decay before the end of the apartheid system, had to be replaced. In response to critics who argued that the SAAF Cheetahs were still good enough to get "the job done," they maintained the Cheetahs were upgrades of older Mirage and Kfir jets and all but a handful were reaching the end of their service lives. In other words, there was a limit to how long they could be kept flying.³⁶

Apart from anti-militarists and activists who questioned the purchasing of Gripen fighters (and submarines, among others) referring to the acute socio-economic needs of the country, a number of respected defense analysts also had reservations about the affordability and relevance of new Gripens in the SAAF inventory. A particularly important voice was that of Major General Len le Roux, a former Chief Director Strategy and Planning in the SANDF, who joined the Pretoria-based Institute of Security Studies (ISS) after his retirement from the military. Le Roux, although not explicitly citing equipment such as the Gripens or submarines, argued that in the African security landscape, the design of continental defense forces would be influenced by economic problems facing the continent and a dire need for socioeconomic upliftment. He felt that matters of force design in South Africa are or should also be influenced by the relative absence of interstate military conflict, the need for collective security actions, and the significant role of non-state actors in security matters and internal conflict. From this view, Le Roux argued and anticipated that defense forces would become more involved in non-traditional military tasks.³⁷

In the scholarly domain, Le Roux's sentiments were, among other, echoed by another highly respected defense analyst, the late Dr. Rocklyn Williams. Williams³⁸ argued that there would be growing political pressure calling for the increased deployment of the military in the secondary or non-traditional roles and that it would not be possible to participate in the secondary functions arena on the basis of collateral utility. He argued that the SANDF had neither the budget nor the equipment or the personnel to do so on the basis of collateral utility. Williams asserted that the South African military of the future would increasingly be configured around non-traditional roles or secondary functions and to this end, he appealed for a force design that would increasingly be suited to African contingencies and less towards a Eurocentric force model. This required a reconsideration of the role and numbers of fighter aircraft.³⁹

In this context, even those who argued in favor of the Gripens had to acknowledge that it was difficult to explain "why simply having a bigger stick than your neighbors is enough to ensure it never needs to be used." Yet, they remained firm in the view that "conventional deterrence of external threats is a major component of the SANDF, and of any professional military" and that the Gripen as a fourth generation fighter has "proved to be a far more sophisticated airframe over any regional power."⁴⁰

In recent years, another controversy has brewed around the Gripens. In June 2016, responding to a parliamentary question from the main opposition party in Parliament, the Democratic Alliance, the Minister of Defence and Military Veterans, Nosiviwe Mapisa-Nqakula, admitted that 12 out of the SAAF's 26 Gripen fighter jets were in long-term storage due to a shortage of funding to fly them. She stated that 13 Gripens were operationally active at their home bases.⁴¹ Brigadier General John Bayne, director of SAAF combat systems, later explained that long-term storage was discussed with the aircraft's manufacturer, SAAB, and that it was decided to use a rotational storage program, which involves "flying the aircraft every now and then."⁴²

In the broader political context, this development followed concerns inside and outside defense circles that, unless the SAAF's budget is increased significantly, the organization would be forced to continue scaling down its level of flying and the number of aircraft available for day-to-day mission flying. Thus the "rotational storage" basically boils down to severe austerity measures that are forcing the SAAF to limit the number of active pilots and aircraft to stay within extremely limited numbers of flying hours.⁴³

Without focusing on a detailed analysis of the entire SAAF inventory, the following should be further mentioned in relation to the modernization of the SAAF since 1990. The first of ten new rebuilt turbine-powered Douglas C-47TP Turbo Dakotas (three for transport, five for maritime patrol, and two for electronic warfare) was put into service in August 1991.⁴⁴ As part of the SAP, South Africa also purchased 50 Swiss-built PC-7 MKII Astra basic trainers to replace the venerable Harvards, which served as basic trainers in the SAAF for many decades. In addition, 24 British-built Hawk jets, single-engine, jet-powered advanced trainer aircraft replaced the old SAAF Impala jet trainers. This put the SAAF in a position to utilize a new trainer jet with the additional capability of being converted swiftly into a combat role if the need arises. The Hawk is regarded as one of the most flexible aircraft in the SAAF fixed-wing inventory and is used for ground attack training and feed-in training for aspirant Gripen pilots.⁴⁵

The SAP also catered for a replacement for the SAAF's Alouette III helicopters by purchasing 30 Agusta Westland A109s from Italy. These have been used extensively across South Africa as light utility aircraft,⁴⁶ although news reports indicated that 18 Agusta A109 helicopters had been grounded in 2013 in view of limited funding and limitations on flying hours,⁴⁷ followed in 2014 by further media reports in 2014 that all flying activities of the entire fleet have been (temporarily) ceased.⁴⁸

This discussion on the SAAF finally needs to report on two issues of political controversy: one internationally and one locally. First, given its firm post-1994 political commitment to support peacekeeping on the African continent, the South African government announced its intent to place an order for eight Airbus Military A400M Loadmaster strategic transport aircraft. Deliveries were scheduled for between 2010 and 2012. However, the program had run into a raft of trouble after differences and confusion between the South African government and Airbus Military over a cost escalation and production delays.⁴⁹

This leaves the SAA in a situation where it is lacking in airlift capability. One of the SAAF's contemporary purchasing priorities, in fact, has been the acquisition of strategic military air transport capability.⁵⁰ This certainly affects the operations of the SANDF and SAAF in the DRC. A recurring difficulty for the SANDF in the DRC has been the transporting of heavy equipment to and from the peacekeeping mission area. The largest airlifter in the SAAF's inventory is the Lockheed Martin C-130BZ Hercules, which has a relatively limited airlift capability. It is at best a medium transporter and can only transport medium-sized cargo to the mission area. This state of affairs has necessitated the chartering – at considerable cost – of heavy lift aircraft from the civilian sector.⁵¹ The situation has aggravated in view of the fact that nine of the SAAF's C130s were grounded in November 2016 with two remaining serviceable. All in all, the C-130s have been in service for half a century and will likely fly until around 2020. Since there is no plan of replacement, this practically leaves the SAAF in a situation where, in the words of retired Brigadier General John Gibbs, a member of the former Defence Review team, “the trajectory as set out in the Defence Review will not be reached and the consequences of that will be the continued decline of defense capabilities to the disadvantage of ordered commitments.”⁵²

Second, a local political controversy played out in recent years around the fact that the SAAF had to use a considerable portion of its slim budget for VIP flying – specifically relating to (former) President Jacob Zuma and senior cabinet ministers. The opposition Democratic Alliance formally posed parliamentary questions to the Minister of Defence and Military Veterans in this regard,⁵³ while critical media reports suggested that the SAAF “has been reduced to operating mainly as a flying limousine” for politicians of the African National Congress (the leading party in government), and had thereby “blown its entire budget for the coming year” – amid a situation where the SAAF “can muster barely a handful of qualified Gripen pilots.”⁵⁴ In fact, it has been reported that 20 percent of SAAF flying hours have gone into VIP flights.⁵⁵

Lastly, as a matter of contextual clarity, it should also be mentioned that the SAAF is experiencing considerable challenges in the areas of maritime surveillance, night-fighting capabilities, electronic warfare platforms, and Unmanned Aerial Vehicle (UAV) sensors.⁵⁶ In addition, the current ground control air defense systems are not sufficient to support airborne safeguarding.⁵⁷ However, this will not receive any particular focus in this discussion.

The SAAF and the need for improved budgetary and political support to the military

From the above, it is clear that there is no doubt that the SAAF is in a process of gradual loss of relevant capabilities. Media reports of recent years ranged from the above-mentioned A400M Airbus debacle to the storage of aircraft to the controversial wrangling regarding presidential air transport. Whereas the SAP had presented the SAAF with new fighters, jet trainers, and light utility helicopters,

there are some major constraints and challenges. The medium and light fixed-wing aircraft are now coming to the end of their operational life. Where the SAAF is seemingly sliding down in terms of meeting demands of the defense policy's air power technology, the decay appears to be especially in terms of air support pertaining to services rendered by transport aircraft and helicopters.⁵⁸

Against this background, *Defence Review 2015*, arguably the most authoritative defense policy framework in South Africa since *Defence Review 1998*, outlines and summarizes the predicament of the SAAF in no uncertain terms:⁵⁹

The SA Air Force remains critically underfunded. This has a direct impact upon its ability to maintain combat readiness across the full spectrum of operational tasks expected of it. The air combat and air combat support capability is severely constrained due to an inadequate flying-hours budget. This has resulted in insufficient pilots being trained to fly the newly acquired fighter aircraft and combat support helicopters; those that have been trained are not being afforded the opportunity to fly the requisite hours for maintaining combat proficiency.... The medium and light fixed-wing transport aircraft are all reaching the end of their operational life. Increased upgrade, repair and maintenance cycles have resulted in a reduction of their operational availability. Currently the fleet is unable to meet the lift requirements for supporting the external operations and any surge in this requirement will result in an even greater reliance on contracted airlift services. The current medium rotary wing transport capability falls far short of the operational requirement.

As already mentioned, this chapter will argue in the final instance that budgetary limitations are highly likely to continue to constrain the SANDF in its entirety – and the SAAF as a part thereof – in the execution of its external role. As far as this argument is concerned, this reasoning is premised on three points of discussion.⁶⁰ These three factors are likely to discourage taxpayers and politicians to be supportive of an increased budget allocation to the military – despite the SANDF being underfunded in the international comparative context⁶¹ and showing signs of erosion in key defense capabilities.

First, the domestic economic growth outlook remains extremely challenging following the economic contraction in the GDP of recent years. Since the worldwide recession in 2008, South Africa's economic growth has been sluggish and below African average. With a World Bank growth expectation of 1.8 percent in 2019 and 1.9 percent in 2020⁶² and an ongoing unemployment rate of more than 25 percent, South African defense spending is obviously under pressure.

At the same time, it should be noted that defense spending has been constantly under pressure ever since a new government took over in 1994. In this regard, a controversy in the South African politico-military environment played out over several years around the so-called “guns versus butter” discourse since 1994. In short, military skeptics or critics felt that post-apartheid South Africa (i.e., after 1994) continued to be too militarized. Abrahams,⁶³ for instance, points

out that post-apartheid activists expected that the new post-1994 government would focus on human development as a priority rather than on the military, and thus move away from the highly militarized pre-1994 history of the country.

In recent times, the “guns versus butter” issue has been still lingering on. A striking example is that of Advocate Simmy Lebala, the evidence leader of the commission of inquiry into allegations of fraud, corruption, impropriety, or irregularity pertaining to the SAP of 1999, known as the Seriti Commission. Lebala strikingly articulated the gist of the “guns versus butter” discourse in his public questioning of Rear Admiral Rusty Higgs on the rationale for buying high-tech military hardware against the backdrop of acute socioeconomic challenges in the country:

Why do we have to behave like superpowers, given our limitations? The history of our country, socio-economic factors, surroundings, and the background inform us that our priorities are health, houses, feeding the poor, HIV and Aids.... Still you want us to employ the military resources that we have on equating us to superpowers. Why can't we be superpowers in our own right by focusing on economic issues?⁶⁴

Second, and relating to the above-mentioned Seriti Commission, research indicates that in South Africa, a high corruption risk is publicly associated with defense matters.⁶⁵ This relates to allegations that political elites were benefitting from corrupt defense acquisition packages, which did not help to facilitate a sound appreciation of South Africa's defense needs and related future financial implications since the end of the 1990s. In fact, political debates on new defense equipment were slowed down by controversy around allegations that there were deviations from traditional acquisition procedures during the purchasing of new defense equipment for the SAAF and the SAN. Sylvester and Seegers⁶⁶ rightly point out that SAP had been the largest public controversy of the new government in the post-apartheid era.

A third factor, which also has a negative influence on the SANDF and its future prospects, specifically the likeliness to obtain a bigger portion of the national budget, relates to a growing knowledge gap on military matters in South Africa. Prof. Lindy Heinecken, a respected military sociologist, points out in her research that the military is no longer a national priority and that neither civil society nor the youth “has any interest in the military.” Public interest of recent years has been largely limited to public concerns, such as controversies around the SAP, scandals relating to bad disciplinary conduct of soldiers or incidents concerning the deaths of several SANDF members by rebels in conflict theaters, such as the Central African Republic in November 2014.⁶⁷ Two researchers from the South African Military Academy, Prof Abel Esterhuyse and Lt Col Benjamin Mokoena likewise contend that “[t]he elite in South African society increasingly distance themselves from the military.”⁶⁸

It also seems that the required focus on and support for the SANDF from political level is lacking. In 2015, the Joint Standing Committee on Defence in

Parliament was supposed to focus on the final version of the Defence Review. However, in a period of six months, only one meeting on the Defence Review was scheduled. Frustrations in this regard urged Mr. David Maynier, a former combat officer in the SAN and now Member of Parliament and spokesperson on finance of the official opposition party, the Democratic Alliance, to state, “In the end, it’s a disgrace that the Defence Force is being held hostage by lazy and disinterested Members of Parliament serving on the Joint Standing Committee on Defence.”⁶⁹ Maynier stated that, from the start, it was clear that members of the ruling party (the African National Congress) serving on the Joint Standing Committee had absolutely no intention of taking the Defence Review seriously, and that they were aware of the fact that every day they wasted, accelerated the decline of the Defence Force.⁷⁰ In this regard, Esterhuyse and Mokoena point out that few politicians and policy-makers have experience in military service and this has impacted negatively on the much needed growth and professionalization of the SANDF.⁷¹

All in all, the above has far-reaching implications for civil–military relations in South Africa⁷² and does not bode well for an increased budget for the SANDF – and the SAAF as an institutional element thereof – to a figure of 1.5 or 1.6 percent of the GDP, which is what many defense analysts suggest for a functional and professional military.⁷³

In the course of 2018, the Department of Defence (DoD) stated in its Annual Performance Plan that the reduction of the department’s budget has effectively rendered the “DoD Plan to Arrest the Decline” as unachievable. To this end, the Department should engage in a complete reappreciation of matters in order to be able to achieve sustainability within the framework of the department’s allocated and available resources. The result of this, according to the Department, is a “significant impact on the capacity and capabilities of the DoD” and the level of South Africa’s “defence ambition in support of its national interest and foreign policy.”⁷⁴ Needless to say, this will also have a significant effect on the future effectiveness and capabilities of the SAAF.

Conclusion

It is clear from the above that a steady erosion of the SANDF’s conventional capabilities has indeed manifested as a grim reality. This state of affairs specifically pertains to the SAAF where, among other matters, several aircraft are coming to the end of their operational life. Two decades after Williams⁷⁵ had proposed an re-evaluation of the methodology adopted by South African defense planners, and had argued against an “obsession with the ‘primary function’ in force planning,” the question is indeed whether a more “realistic assessment” of the SANDF in the context of the growing importance of non-traditional military tasks would not have put the SAAF in a better position in terms of its budget, functionality, and sustainability.⁷⁶

This might indeed be the case, but it is also clear from the above that there is currently little political drive in South Africa to see an increased budget for the

military. The focus of politicians and much of the general public is largely on dire socioeconomic challenges, specifically health, housing, education, and employment in the country. In fact, the SANDF would probably find it very difficult to convince politicians, taxpayers, and the public at large that an increase in the defense budget is imperative and required for the SANDF to play a more meaningful role in South Africa's foreign policy. In view of the above, Louw⁷⁷ rightly observes that the military is finding itself in a situation where there is a large variance between defense policy, military capabilities, and real operational demands, all of which are premised on a lack of responsiveness to the resource constraints experienced in the SANDF with regard to its operational realities. This explains why the SANDF – and this includes the SAAF – has been largely unsuccessful in complying with the demands of defense policy.

Louw⁷⁸ rightly observes that with an “insolvent defence policy lately appearing to coincide with financial bankruptcy, the SANDF may just be heading for a perfect storm.” There can be no doubt that this is of relevance to the SAAF as the latter forms an integral part of the SANDF. Moreover, as the Chief of the SAAF, Lieutenant General Fabian “Jakes” Msimang candidly acknowledged, “our chronic below global acceptable defence budget allocation levels will render us vulnerable, weak and undependable.”⁷⁹ This is the current reality facing the SAAF and its short- to medium-term future should be understood in this context.

Notes

- 1 The author wishes to note that this chapter is based upon work financially supported by the National Research Foundation of South Africa. Any opinion, findings, and conclusions or recommendations expressed in this material are those of the author and therefore the NRF does not accept any liability with regard thereto.
- 2 defenceWeb, 2016.
- 3 defenceWeb, 2016.
- 4 Sylvester and Seegers, 2008: p. 72.
- 5 Department of Defence and Military Veterans, 2015.
- 6 Sunday Times, 2010.
- 7 See Wessels, 2012: p. 222.
- 8 Southall, 2006: p. 1.
- 9 Du Plessis, 2003: p. 115.
- 10 Department of Defence, 1998: 12–19.
- 11 Esterhuyse, 2010: pp. 16–17.
- 12 Nyanda, 2003: p. 4.
- 13 Department of Foreign Affairs, 1999: p. 3.
- 14 United Nations, 2009.
- 15 Engelbrecht, 2001: p. 2, p. 5.
- 16 GlobalSecurity.org, 2016.
- 17 Engelbrecht, 2001: p. 2, p. 5.
- 18 Barrel, 1998: p. 27.
- 19 The SA Army was not a beneficiary of the SAP.
- 20 Department of Defence, 1999: p. 1.
- 21 Le Roux, 1999: p. 60–64; Williams, 1998: p. 34.
- 22 Sylvester and Seegers, 2008: p. 52, p. 60, p. 62.
- 23 Sylvester and Seegers, 2008: p. 62.

- 24 Global Firepower, 2018.
- 25 Global Firepower, 2018.
- 26 Wessels, 2012: pp. 237–238.
- 27 Wessels, 2012: p. 238.
- 28 Wessels, 2012: p. 238.
- 29 Fabricius, 2017.
- 30 African Aerospace Online News Service, 2015.
- 31 Wingrin, 2014b.
- 32 Olivier, 2013.
- 33 Martin, 2016a.
- 34 Wessels, 2012: p. 240.
- 35 Stupart, 2016.
- 36 Stupart, 2016.
- 37 Le Roux, 1999: p. 61, p. 64.
- 38 Williams, 1998: p. 34.
- 39 Williams, 1998: p. 34, p. 37.
- 40 Stupart, 2016.
- 41 defenceWeb, 2016.
- 42 IOL News, 2013; Stupart, 2016.
- 43 defenceWeb, 2016.
- 44 Wessels, 2012: p. 238, p. 241.
- 45 Stupart, 2016; Wessels, 2012: p. 238.
- 46 Stupart, 2016.
- 47 Sapa, 2013.
- 48 Wingrin, 2014a.
- 49 defenceWeb, 2009.
- 50 defenceWeb, 2009.
- 51 African Aerospace Online News Service, 2015.
- 52 As quoted by Martin, 2016b.
- 53 Helfrich, 2017.
- 54 Saunderson-Meyer, 2016.
- 55 Martin, 2016b.
- 56 Louw, 2013: p. 71.
- 57 Martin, 2017.
- 58 Louw, 2013: pp. 70–71.
- 59 Department of Defence and Military Veterans, 2015: pp. 9–15.
- 60 This section draws from an earlier study on the South African Navy (see Neethling, T., South Africa and maritime security: Interests, objectives, policies and challenges. In Hensel, H. and Gupta, A. [eds.] *Naval Powers in the Indian Ocean and Western Pacific*. Routledge: New York, 2018).
- 61 Cilliers, 2014: p. 4.
- 62 World Bank, 2018.
- 63 Abrahams, 2001: p. 1.
- 64 As quoted by News24, 2013.
- 65 Walker, 2015.
- 66 Sylvester and Seegers, 2008: p. 52.
- 67 Heinecken, 2016: pp. 38–39.
- 68 Esterhuyse and Mokoena, 2018: p. 6.
- 69 Maynier, 2015.
- 70 Maynier, 2015.
- 71 Esterhuyse and Mokoena, 2018: p. 6.
- 72 Heinecken, 2016: p. 44.
- 73 De Wet, 2012.
- 74 defenceWeb, 2018.

- 75 Williams, 1998: p. 1.
- 76 Williams, 1998: p. 2.
- 77 Louw, 2013: p. ii.
- 78 Louw, 2013: p. 85.
- 79 As quoted by Martin, 2016b.

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Conclusion¹

Howard M. Hensel

The waters of the Indian Ocean and the Western Pacific cover a significant portion of the globe and can be analytically divided into a series of sub-regions that are, in certain respects, self-contained, but in other respects, overlap with neighboring sub-regions. Many of the sub-regions of the Indo-Pacific confront a variety of traditional and non-traditional challenges of varying levels of gravity and immediacy. Some of these challenges are unique to particular sub-regions, whereas others are challenges that transcend individual sub-regions and are common throughout the basin and the Western Pacific.

The chapters in this volume analyzed the ways in which many of the littoral and non-littoral states involved in the Indo-Pacific assess the immediacy and severity of these various traditional and non-traditional, sub-regional, regional, and trans-regional challenges. Complementing the previous volume in this collection of works which focused on the role of naval power in the Indo-Pacific, the chapters in this volume focused on air power's role as an instrument of power available to policy makers as they attempt to respond to these challenges. In doing so, the chapters highlighted a series of common themes designed, in turn, to illuminate the roles played by air power in terms of doctrine, capabilities, deployment patterns, missions, and future issues, within the broader, synergistic context of military power generally.

As suggested throughout the book, Chinese, North Korean, Iranian, and Russian policies are said to constitute fundamental challenges to the rules-based order in the Indian Ocean and the Western Pacific. The various contributors to this volume assert that international community cannot ignore China's forward policies in the South and East China Seas, as well as its policies toward Taiwan, North Korea's policies on the Korean Peninsula and in Northeast Asia, and Iran's destabilizing policies in the Persian Gulf and, more broadly, throughout the Middle East. Simultaneously, however, as previously suggested in the conclusion to the second volume in this series of companion works focusing on the Indian Ocean and the Western Pacific, notwithstanding the conflicting perceptions, interests, and objectives among the littoral and non-littoral powers, there are also a great many areas of coinciding interests and objectives. These areas of commonality include: the desire among the various powers to perpetuate their respective regimes and forms of government; the prevention of crises that could

too easily escalate into armed confrontations and the initiation of military hostilities; the maintenance of stable, rules-based regional environments that would ensure the freedom of navigation through international waters, as well as guarantee sovereignty, territorial integrity, and rights within exclusive economic zones; prosperous state, regional, and global economies; effective measures designed to counter and eliminate the threats posed by terrorists, illicit fishing, and other criminal activity; the protection of the citizens of the various powers residing or traveling throughout the regions; environmental protection; and support for humanitarian assistance in response to natural and man-made disasters. These areas of commonality have often served as the basis of international cooperation in the past and they continue to invite greater future cooperation among the various littoral and non-littoral powers. Indeed, cooperation that successfully addresses these commonly recognized challenges also serves as “confidence-building measures” that further encourage the resolution or, at least, effective management of vexing challenges involving serious clashes of interests and objectives among the various powers. Military instruments, especially air and naval power, synergistically combined with diplomacy and other policy instruments can help facilitate cooperation in response to common challenges, based on coinciding interests. Similarly, a whole of government approach among the various powers can help resolve, or at least effectively manage areas where interests conflict.

Surveying the air power capabilities of the various littoral powers, while some powers possess very capable air power assets, many other air forces suffer from budgetary constraints, resulting in uneven and/or inadequate capabilities that, in turn, negatively impact their ability to successfully respond to traditional and non-traditional challenges. Complicating matters further, many of these air forces are supplied by a large number of rival international aerospace arms dealers. Indeed, in certain cases, the supply of these weapons systems has proven to be undependable due to the periodic production interruptions and/or the imposition of economic sanctions.

In this context, it is vitally important for the United States to continue to play a central role: in reliably assisting its regional allies and partners to further develop their air power capabilities; in promoting effective combined and joint military cooperation; in facilitating effective responses to non-traditional challenges; and in deterring potential adversaries from embarking upon aggressive, destabilizing policies that could escalate into armed confrontations and open hostilities. In situations where deterrence fails, however, as a last resort, optimally with broad international support, the use of armed force may become an unavoidable response to persistent provocations by aggressive, destabilizing powers. In such circumstances, the response may involve limited, discriminate, and proportionate precision air strikes taken in a manner consistent with international humanitarian law. In extreme situations, however, the United States, joined by its allies and coalition partners, must remain both resolute and fully prepared to use its air, sea, land, cyber, and space assets, individually or in combination, as a last resort, to successfully engage and defeat any power whose

actions egregiously violate the fundamental principles underpinning the rules-based international order, especially the rules governing the freedom of navigation through international waters, and, generally, pose an extremely grave and immediate threat to the security and stability of the Indian Ocean and Western Pacific regions. In order to provide effective leadership, the United States must not only maintain, but expand its air and naval presence in the Indian Ocean and Western Pacific regions. In doing so, however, it must proceed carefully, so as not to provoke an unintended negative response by other powers.

Finally, returning to the central theme running throughout each of these three companion volumes focusing on the Indian Ocean and the Western Pacific, these two geo-strategically and economically overlapping regions should, in many respects, be seen and approached as a single, integrated, interdependent Indo-Pacific whole. Certainly, there are challenges that are unique to individual sub-regions and these must be addressed on a sub-regional basis. Indeed, future volumes in this collection of companion works will analyze and assess the contemporary security challenges in particular sub-regions of the Indian Ocean and the Western Pacific, such as the Persian Gulf and the South China Sea. Moreover, other challenges overlap between multiple sub-regions, while still others exclusively encompass the entire Indian Ocean basin or the Western Pacific region. These too must be addressed within the appropriate geographical context. But as we appropriately focus on sub-regional dynamics, we must not ignore the fact that, with ever-increasing urgency, the global community is confronted with challenges that are common to and encompass the entire Indo-Pacific whole. As such, while not neglecting sub-regional challenges, it is imperative for the prosperity, stability, and even survival of the global community that policy makers recognize this reality and, accordingly, formulate policies predicated upon the accelerating linkages that intertwine the Indian Ocean basin and the Western Pacific together into a single integrated economic and geo-strategic whole.

Note

- 1 The opinions, conclusions, and/or recommendations expressed or implied within this chapter are solely those of the author and should not be interpreted as representing the views of the Air War College, the Air University, the U.S. Air Force, the U.S. Department of Defense, or any other U.S. government agency.

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